INTERNATIONAL MONTHLY MAGAZINE BY AND FOR ACTIVE RADIOAMATEURS

Radiosporting

MAY 1987 No. 26 8705 $2.00

WHEN OCEAN WAVES MEET RADIO WAVES
AT MARKET REEF — OH[illegible]OJØ

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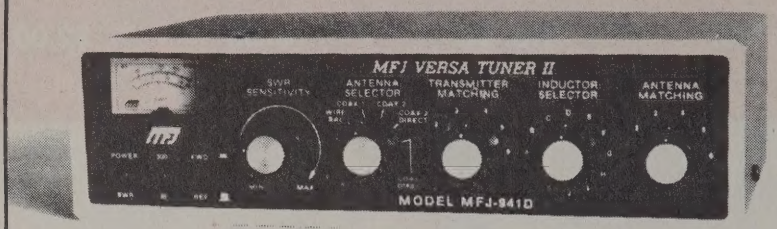
MFJ ACCESSORIES

300 WATT ANTENNA TUNER HAS SWR/WATTMETER, ANTENNA SWITCH, BALUN. MATCHES VIRTUALLY EVERYTHING FROM 1.8 TO 30 MHz.



$99.95 MFJ-941D

NEW FEATURES

MFJ's fastest selling tuner packs in plenty of new features!

- **New Styling!** Brushed aluminum front. All metal cabinet.
- **New SWR/Wattmeter!** More accurate. Switch selectable 300/30 watt ranges. Read forward/reflected power.
- **New Antenna Switch!** Front panel mounted. Select 2 coax lines, direct or through tuner, random wire/balanced line or tuner bypass for dummy load.
- **New airwound inductor!** Larger more efficient 12 position airwound inductor gives lower losses and more watts out. Run up to 300 watts RF power output. Matches everything from 1.8 to 30 MHz: dipoles, inverted vee, random wires, verticals, mobile whips, beams, balanced and coax lines. Built-in 4:1 balun for balanced lines. 1000V capacitor spacing. Black. 11x3x7 inches. Works with all solid state or tube rigs. Easy to use, anywhere.

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Maximize your antenna performance! **$59.95** MFJ-202B

Tells whether to shorten or lengthen antenna for minimum SWR. Measure resonant frequency, radiation resistance and reactance.

New Features: individually calibrated resistance scale, expanded capacitance range (±150 pf). Built-in range extender for measurements beyond scale readings. 1-100 MHz. Comprehensive manual. Use 9 V battery. 2x4x4 in.

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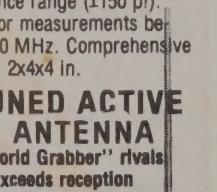

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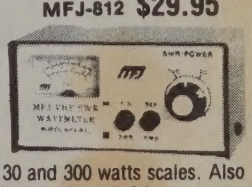
VHF SWR/WATTMETER

MFJ-812 **$29.95**



Low cost VHF SWR/Wattmeter! Read SWR (14 to 170 MHz) and forward/reflected power at 2 meters. Has 30 and 300 watts scales. Also read relative field strength. 4x2x3 in.

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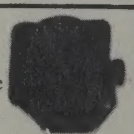
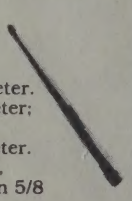
Compact Speaker



MFJ-280, $18.95. Mobile speaker. Tilt bracket on magnetic base. 3½ mm phone plug. Use with 8 & 4 ohm impedances. Handles 3 watts audio.

Handheld Telescoping Antennas with BNC



MFJ-1710, $9.95, 3/8 wave 2 Meter.
MFJ-1712, $14.95, ¼ wave 2 Meter; 5/8 wave 440 MHz.
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Monobanders for 10, 15, & 20 in stock! **CALL!**
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VHF / UHF Verticals and Scanner Ants. in stock.

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TA-33Jr / TA-40KR.....179.00 / 89.95
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DX-D / DX-DD Dipoles.....79.95 / 89.95
Delta-4 / Delta-4N Coax Switches.....65.00 / 75.00
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6BTV / 5BTV Verticals.....$127.95 / 106.00
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HF Mobile Masts, Resonators, & Mounts
CALL!

Larsen Antennas

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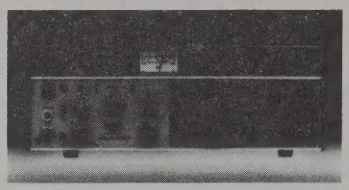

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Model 585 PARAGON

NEW! 200W Full featured HF Transceiver. Microprocessor controlled. General coverage.

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Model 561 Corsair II
Model 425 Titan Linear Amplifier
Model 579 Century/22 - 50W CW Transceiver
Model 229A 2KW Antenna Tuner
Model RX-325 General Coverage Receiver
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RS-35A / -50A.....129.95 / 186.95
RS-20M / -35M.....102.95 / 146.95
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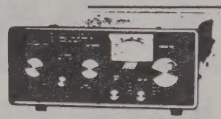
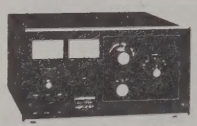


Tuners, meters, keyers, switches, PACKET!!



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KDK FM-240

SANTEC ST-20T

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HAM IV	CALL	KR-500 / -500B	189.00 / 259.95
CD 45 II	CALL	KR-2000 / -2000RC	449.95 / 479.95
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Cable Ends: 9901LD / 9902LD.....7.95 / 9.50
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WIRE & CABLE

BELDEN COAX

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RG-213/U (8267)	0.40	RG-11A/U (8261)	0.37
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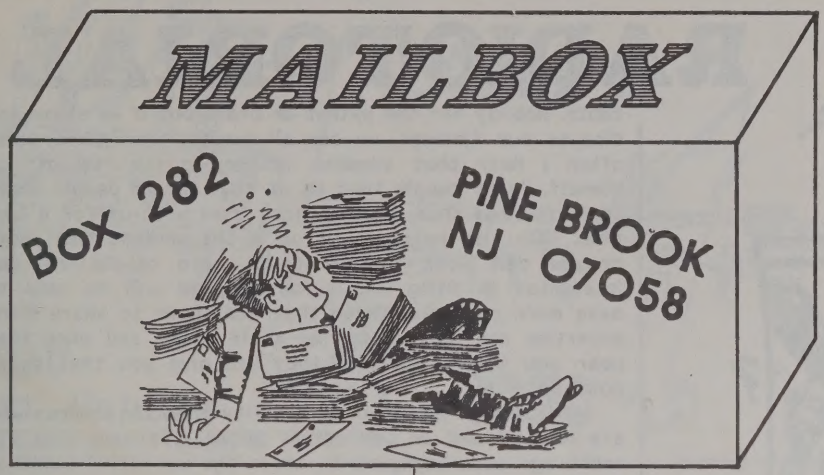


NK7U:

Enclosed is my renewal. I have enjoyed every issue since #1. I take every ham magazine and can say without reservation that RADIOSPORTING is the first one read each month. Contesting has become the main part of my radio life and I anxiously await each issue to see what new ideas I can find.

Keep up the great work and I hope to meet you someday. 73 Joe Rudi, NK7U

K6MBV:

I love your magazine. Saw the first issue at the International DX Convention in Visalia, CA in 1985. I have been happy ever since. Keep up good work on contests and DX. What happened to the Razor Beam? Michael Young, K6MBV

Razor articles are in the works, I just need a bit more time to do it properly. Stay tuned!

Yuri

NG2X:

I hope to see someone come up with article for contest duping with the IBM PC, I'm really sick of the Commodore 64! Brad, NG2X

VK9NL:

Jim (VK9NS) and I enjoy reading RADIOSPORTING and think it fills a gap in the amateur radio literature. Most magazines, as you now, are highly technical with little of interest for the not so technical minded hams.

Jim is very busy with QSL cards from his expedition to VK9Y and VK9X, but he is back in stride now, running the 14220 net as usual. Good luck with RADIOSPORTING! Maybe we'll hear you on the bands one of these days.

Kirsti Jenkins - Smith, VK9NL

KA2CC:

Dear Yuri, thank you for the sample copy of RADIOSPORTING and I like it. And like the idea of DXCA award with no help from nets.

After listening to some nets in the states (and a well known one here in the Pacific), I don't have any use for them.

I worked one net (14.160) from Minami Torishima, and it actually slowed the QSO rate down, after that, I went on my own, taking my own list (4 to 5 calls at the time), and then working them. I did get into a trap (same as Len, KHØAC) with a Russian station, wanting to be my "list taker," without taking no for an answer. Charlie, KA2CC

KC8PG:

Dear Yuri, Thanks for a fine magazine with all the things I like to read about. Included is my renewal for two more years.

Also included is a letter that was received by a local novice who let his license expire and was near the end of his grace period. This letter tells him that for $35 they will help him renew his license. Although this may not be illegal, I'm of the opinion this is very unethical. For 22 cents we got this novices license renewed. This "company" or "organization" is attacking one of the most venerable parts of our ham radio community because of their lack of education in licensing practice. Please help by informing all hams to keep their eyes open and help out our fellow brothers.

Thanks for all your help and a great magazine. 73 Jim, KC8PG

Those above mentioned letters are sent out by the "Federal Licensing, J.V., Amateur Radio Service Division," Gettysburg, PA, PO Box 610, PA 17325 and signed by John Hertrick. It looks like it has something to do with FCC but it is just another scheme to take advantage of ignorant hams. Don't fall for it! Send in your own renewal, it costs only 22 cents for the stamp!

K4ZN:

Yuri, I liked your Radiotorial about exercising the brain, and I'd like to add that it would be interesting to have someone do an evaluation of hams, find out how our IQ stands. Most of the hams I've met would rate pretty high, I believe, not only intellectual ability but also in practical know-how. Whether ham radio is the cause or the effect would be another question. Chuck Clark, K4ZN

N4ZR:

I was shocked to read about ZS6BRZ's experience with his computer program. While it is terribly difficult to be sure of getting rid of absolutely every bug in a complex program, there should not be anything that cannot be recovered from. Experiences like Sam's can really put you off computers.

In that connection I have began offering my software on a 30-day, no questions asked, money back guarantee basis. I don't want anyone left feeling dissatisfied, and I'm confident that I can trust contesters not to take unfair advantage.

Pete Smith, N4ZR, Winner's Edge Software

KØIR:

Dear Yuri, we enjoy doing business with the contesters and DXers; they are knowledgeable and interesting group. Both of us here, myself and my partner George, ADØS, enjoy these activities and George has had the opportunity to operate from Kingman and Palmyra. Ralph Fedor, KØIR, RF Enterprises

SMØAGD:

I came home from Tanzania and trying to catch up with the daily routines again. I had an interesting trip, but I was very busy and had almost no time for ham radio. I went by car (land cruiser) 5000 km all over the country where they have saw-mills, on the slopes of the Kilimanjaro, to islands in the Victoria lake... I passed through wild life reserves like Serengeti and the Ngorogo Crater and saw plenty of animals but unfortunately I had no time to stop and join our cousins.

In the mean time I understand there has been a lot of fun on the DX bands. It seems like the 3Y operation was a success, I am glad so many managed to make QSO. I met Einar, LA1EE one dark night right at the border between Norway and Sweden. He returned my IC-735 they had used down there at Peter I. It was interesting to hear some of his experiences.

Thanks again for the good magazine and I am sorry I've not been able to produce more material for it. Next time I might try to sell used cars... Hi Eric Sjölund, SMØAGD

K1VLB:

A couple of weeks ago I was sitting and listening to the pileup on 3B8DB on 14.011. What a mess that was! I swear half the stations calling had receiver problem.

I heard stations calling while 3B8DB was transmitting, working another station - I wonder how they expected to be heard? Must be their receiver. Some were continuously sending their callsign while 3B8DB was calling another station. There were also those who apparently felt necessary to retune their transmitters while 3B8DB was working another station. They obviously couldn't hear 3B8DB, or the stations he was working. More receiver problems I suspect.

I am amazed at how poorly amateur radio operators seem to behave when a rare DX station comes on the air, but it's a good thing I know better - they just don't make receivers like they used to! Mike Hopkins, K1VLB

WU4G:

CQ Yuri... Where are you? Much QSB on your magazine lately. Hope things will fall together for you soon as I do look forward to each issue. Here is my renewal, put it to good use.

On a contesting note, it would be very interesting to see what contesting aids others have come up with to make life easier. What I have in mind are the things like auto CQers for phone contests, contest type keyers, and neat little boxes to allow ops to mix the HF and 2 meter into their headphones so as to be able to monitor both. 73 and happy contesting!

Ron Bolton, WU4G

Dear Ron, sorry about the QSB, but we are only human and it looks like we are coming out of our moving and startup problems and we should be getting better with sunspots. There is a phone CQ machine DVK-100, we had an article on it. The easiest way to mix the output from two radios is to stick one of those 50 cent miniature earphones in one of your ears and then over that put your regular headphones. We will have more stuff on the tricks of trade by KQ2M and maybe even VE3BMV in the upcoming issues. You asked for it, you'll get it! 73 Yuri

VE7AJP:

Yuri, here is my renewal for 2 years. What a dynamite rag! I just dropped QST after 12 years - far too general and diluted, can whiz through a QST in 20 minutes. RADIOSPORTING makes for an excellent coffee room reading material. Thanks, Jim, VE7AJP

VE3BMV/W2

RADIOTORIAL

Here we are at the Dayton Hamvention time again. The greatest show of all radio shows. We are looking forward to meeting you, to shake your hand and to hear what you would like to see in the future of RADIOSPORTING. It will be another marathon of late nights in the hospitality suites, sharing adventures, swapping lies, and trying to get as much from the Hamvention's offering as possible. During the three days in Dayton we have the opportunity to meet many people that we have heard or worked on the bands, talk to the manufacturers and dealers, go wild in the flea market and gain some knowledge at the many forums.

IRSA and RADIOSPORTING hoped to have the sportsmen banquet in the evening, where members of the DX and contest family would sit down, have a nice dinner, hear interesting speakers, present awards and then have discussions on the topics of interest to us. We keep asking for help from the Dayton area hams, but for some reason not much is happening. Producing the monthly magazine is very time consuming. I would like the IRSA and RADIOSPORTING to become your forum. I provided the fool who wants to help DXers and contesters to have more fun and to enjoy reading about interesting things. We started a number of programs, contests and awards that try to reflect the needs of today's radio sportsmen.

We are extremely grateful to all those who see this goal and contribute to our magazine. If you, readers, enjoy their writing, send them a note. We are also grateful to all those who support us by subscribing to RADIOSPORTING and we are working hard to make this your number one magazine. Most of our contributors are tops in their fields. They write not because they want to get rich and famous, but because they love the hobby and they want all of us to have more enjoyment and get better at it. RADIOSPORTING is proud to have them on its teem. Your comments and notes of appreciation are a small reward for all the work they do.

With your continued support we will get better and bigger. We proved that DXers and contesters need their own publication and now we have to increase our subscriber's base. With your help we will be promoting IRSA and RADIOSPORTING on a wider scale. Please tell your friends about us (and gain one extra issue on your subscription). If you have any material, photos and news, send them in. If you have better ideas or know more than what you read on our pages, grab a pen or a word processor and let us know. There are still many unexplored areas.

If you are on the DXpedition or planning a contest operation, please let us know and we will get your news out quickly. Want to share your experiences? Write it up for our appreciative readers. We competitive hams are in a unique position to push the art of communication to the limits. Nobody has the patent on brain, but if we share and discuss our findings, we can all benefit from them. Quite often I hear that someone is keeping the "secret" to himself. Petty people tend to do that. Great people share their findings thus, their memory lives with us for a long time. This also helps all of us in the present time: more people can work rare stations, more people will get interested in DXing and contesting, we will be able to make more contacts. Those that are known to share their expertise are appreciated by their peers, and when they hear you in the contests they will give you that extra point for sure.

We will have an influx of activity from the novices who are now allowed on ten meters phone. Perhaps this will encourage more beginners to enter the wonderful world of HF even though they could have listened at any time before. I hope they do not get poisoned by some of the bad apples that are floating around the HF bands. We should gently point out their errors in operating procedures if we come across them. We hope that they will catch the sport bug and enjoy this hobby to its fullest extent. We will have a regular column on 10 meters by K1PLR, where we will cater to old tigers and novices alike. I just hope that our hobby does not get deregulated all the way to the CB level. No one would be able to restore that.

The question of high power comes up from time to time. We have a translation of interesting article about UH8EA and his visit from the Central Radioclub of USSR during a contest. Also, there is an article by K1GQ reprinted from the YCCC Scuttlebutt Bulletin about one of his competitors running higher power than allowed by the regulations. Its especially unfair in the contest when one station runs the legal limit while another runs a lot more. Is there perhaps time to do some spot checks during the contests? Lets clean up our act and get rid of those two holer Alphas and other Godzilla brand amplifiers, especially when competing in the contest. Lets play by the rules.

There is an outfit located near FCC that offers services for the renewal of your license for a fee. Don't swallow it. Do it on your own for the cost of a 22 cent stamp.

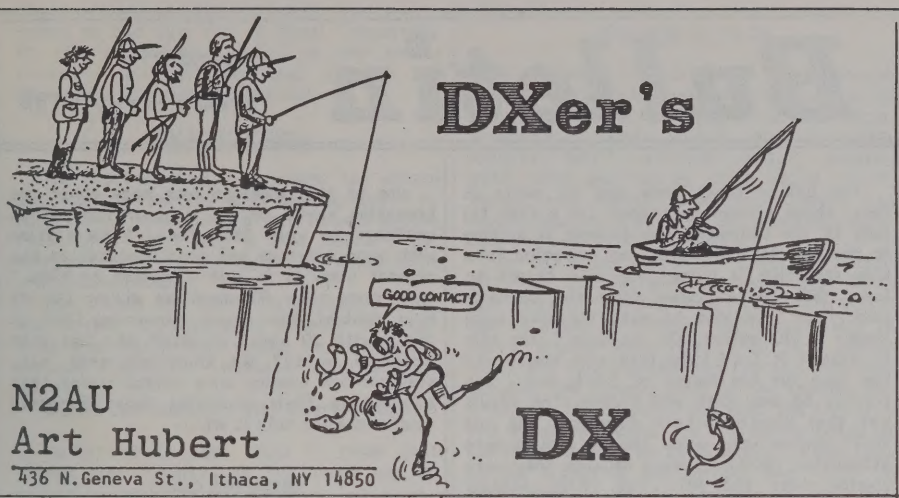
We finally have the results of the 1986 CAN-AM contest. The certificates are being printed and should go in the mail by the end of May, including the ones for the previous contests.

The backlog is getting smaller therefore we should be getting back on schedule. The next few months will still be hectic, but we are working towards the improvement of the quality of your favorite magazine. Sending the material on a diskette helps tremendously and we now take Commodore 64, Apple II, Macintosh and IBM PC formats. A laser printer is just around the corner. I have also finished a modification for the IBM PC family of computers that allows letter, or near letter quality wordprocessing and use of a standard program in any language or alphabet. Want to beg for that rare QSL card in their native language? It is possible now.

We welcome RF Enterprises and Ham Radio Outlet as our new major advertisers and supporters. Please tell them where you have seen their ads and how much you appreciate their support. They have an excellent reputation and are run by active DXers and contesters. Give them your business and keep it in the family.

Computeradio is getting an excellent response on their Snap-On-Chokes. If you have any interference problems around the shack or with your neighbors, you should try them. They will be available at the RADIOSPORTING booth at Dayton or from your dealer.

Gotta rush to the printer with this issue. See you all at Dayton and have a good time! 73 de Yuri



N2AU
Art Hubert
436 N.Geneva St., Ithaca, NY 14850

This month's N2AU DX column is somewhere in the mail. Bulk of the information is from The DX Bulletin published by Chod Harris, VP2ML.

Going to Dayton? We hope to see you there. Look for RADIOSPORTING bunch in booth #430, just around the corner from the room #1, where the DX and Contest Forums are held.

The Kansas City DX Club is sponsoring their famous Hospitality Suite at Stouffer's Hotel, room 525 on the 5th floor. Video movies, Pileup contest and prizes + 807s!

Have you ever worked OHØBE or OH2BE? This lovely YL is XYL of Martii Laine, OH2BH, OHØBH and multitude of other DXpedition calls. If you ever get the QSL card from Leena here is what she says on it:

Marrying a true blue DX type can change one's outlook on life dramatically. When I met a beady-eyed, casually dressed young man - a boy who always looked tired with only a few hours of sleep, who was late for dates and did not care a damn about wonderful hikes in the country , rhythmic dancing or long weekends spent together - I just didn't know what was to come. Everything was so different from what a young girl had expected of life and youthful love. Guess I was even more confused when I found myself under the chiming wedding bells, committing myself to support this union no matter what came up. It was time to settle down under the same roof and find out what it was all about. The radios moved in first and the hilltop land had to nourish and nurse antenna towers since the earth would have been too dry for a garden anyway. New countries had to be caught during their first hours of operating, night or day, just in case a generator failure might put them off the air. Messing around all over the world to win inhumane 48-hour contests and much more. I found I had married a HAM called OH2BH - a DX type.

Now having joined the ranks of licensed radio amateurs and enjoying every aspect of ham radio, I have finally discovered that this is the most fascinating hobby in the world- and even more, it's a way of life. Without it, I might not have met all those wonderful people. I might not have seen a great deal of this globe and found a world of great contrasts. I don't just sit around the fireworks but fire up the gear to chase that DXpedition, one that even my husband may be running. Surely, I have an advantage over others calling there but I feel that I have earned it.

Marrying a true-blue DX type has not only changed my outlook on life but it has also put me in touch with the world of amateur radio to which I owe a lot.

Leena Laine, OH2BE, OHØBE

5AØA, Libya

Bert is making good use of his donated FT-901 and 3 element beam. He worked many US East Coast stations on 21260 SSB around 1800-1900Z April 8 and 9. Beware of "insurance" contacts; Bert has blasted a couple of DXers who called him after a successful QSO! Remember: no questions and no callsigns on the envelope to his QSL manager SP6BZ.

9L1GG, Sierra Leone

is with US embassy and FOC member. Provides much appreciated CW contacts. QSL via N4DW (not N4NW)

BV2B, Taiwan

is active on Sundays 14227 at 2330Z.

BYØAA, China

is in zone 23 on 14025 after 0000Z. He has been pounding into the East Coast on a daily basis.

C56/G3OLU, Gambia

is slated to be 5 kHz up on CW 10 - 160 m. QSL with SAE and IRCs to G3OLU.

DK6NN/C6, Bahamas

should be on through May 18 from Abaco. Watch 7015 at 0200Z on even numbered days. AMTOR 14091: DKNN. QSL via his home call or bureau.

FR/5ZU/E, Europa Isl.

is now active, especially on French nets, such as one on 14116.

P54AR, Aruba

Bob Wilson, KA1XN will operate from P54AR April 24 - May 2, in celebration of the Aruba Roadrace, an international 10 kilometer foot race on April 30, in which Bob will compete. This is the first use for prefix P45. Watch 24 kHz up on CW, 1826 kHz on top band. He will also try 50.110 MHz as well. QSL with SASE to WA1ZDE.

SV9, Crete

DL2BK promises low band activity till mid May. QSL DL2BK.

T32BF, Christmas Isl.

is the new call of KH6GDR. QSL to his home call.

UD6DC/UD2N, Azerbaijan

will be on May 2- 10 from this oblast No.002. This is the small section of Azerbaijan that is physically separated from most of the USSR. Watch CQ MIR contest for increased activity from the rare oblasts and republics.

VKØGC, Macquarie Isl.

Graham Currie is often on 80 m SSB at 0700 and then moves to 40 m SSB around 7083.

VR6TC, Pitcairn

Tom Christian is back on Pitcairn after a long illness. Try 14187 at 0200Z. Wife Betty, VR6YL is also active.

VU4, Nicobar Isl.

Second hand reports continue to arrive from India that VU4NRO will be active again first week in May.

WN5K address

Paul's, WN5K address has been changed to 41067 Hwy 931, Gonzales, LA 70737. He is a QSL manager for VP5DG, V44KA and J88BK.

Congratulations to HB9AMO?

Apparently Pierre, HB9AMO is the first one to work 40 zones on 160 meters. We will have to wait for the positive proof, because there was a false alarm with G3SZA being reported to work the last one.

Paul Young, K1XM and his XYL Charlotte Richardson, KQ1F operated from Belau, (ex Western Carolines) as KC6MX and KC6IF. They operated primarily low bands. They were dissapointed with poor propagation and very short openings. The European opening lasted three minute around 2046Z! VU4APR/RBI answered their CQ!!! (VE3BMV)

160 m Bulletin

Founder - Stew Perry, W1BB

160 m DX News

Wally Stefanoff, LZ2CJ

PO Box 73, Levski, Bulgaria

One more 160 m season is moving to its end and I hope all of you were able to work a good number of new countries. Doing the summary at LZ2CJ I felt sad that I was not able to do more. There are more important things in life than ham radio. Considering that, even taking part in a few contests seems a lot.

SLOPING BEVERAGES

I would like to share some of my experiences with sloping Beverages as ON4UN discussed them in the January issue of RADIOSPORTING. All of my Beverages, except one for Japan are of this kind. I had a chance to listen on "normal" Beverages at LZ2KTS/LZ7A and LZ2AB locations. They are the same length as mine. I was not able to compare the antennas at the same time because of the distance between our locations, but the "old tigers" know how the things sound or should sound when listening on the band. I have to admit that ON4UN theoretical predictions have been confirmed at my QTH.

My contest QTH is situated very close to the top of the hill, on the side of the hill which is sloping about 15 to 20 degrees. My antennas are one wire unterminated long wires running in the directions of USA - VK/ZL, Africa - North Europe, S. America - USSR.

The USA - VK/ZL wire was 1.5 meter (5 feet) above ground and about 110 m (340 ft) long at the beginning. The antenna is sloping in the direction of VK/ZL and reception form this direction is quite good also thanks to lower QRM levels coming from the opposite side. Then I decided to make the wire much longer - 310 meters, the maximum I was able to extend it to. I knew that this length was too long for the height of 1.5 m, but I was curious to see what will happen. The result was that signals in both directions USA and VK/ZL became very weak. The US signals were attenuated relatively more because they were coming over the hill, the VK/ZL signals because of the described sloping effect.

What I did next, I started to cut off the pieces of wire and tried various lengths between 110 and 310 meters till the day when I reached the best length for my situation. This ended up to be about 200 meters (650 ft)! This resulted in good reception form VK/ZL and a much better reception of US signals than I had with 110 or 310 m wires. It is of course beneficial to terminate the wires with resistors for better performance. In my case I can not run wires in the other directions so I am stuck with unterminated antennas. (Try SWA - Stearable Wave Antenna. - VE3BMV)

Once at LZ1KDP we ran the 500 m long wire in the direction of USA. The wire was coming down from the 30 m high building and then continued 3 m off the ground. This one was no good at all, too noisy and weak signals. (Should have used matching transformer on the ground and then run coax to the receiver. - VE3BMV)

VE3INQ and his CTBN

Ivan, VE3INQ wrote very interesting letter and send some samples of his CTBN - Canadian Top Band News newsletter that he publishes twice a year. It is available for SASE from VE3INQ, Box 146 Station E, Toronto, ON M6H 4E1.

One of the comments Ivan made about the operating habits of 160 m gang: there is no challenge to work DXCC for a 2 kW station with good antennas and good operator at the present time. It is just a matter of time. I work more than 60 countries during the 48 hour contest. How about announcing DXCC on 160 m with 30 watts or less? Why less than true 30 watts? We know all, that many stations are running more output power than allowed in their countries (most European countries allow only 10 W).

PHONY QSL CARDS

Dan, KL7Y wrote about some operators who send him QSL cards filled out except for the date and time, without even trying to make the real contact! He mentioned that those cards were received from OK, EA, CT, UB, UR, UA, LZ and USA. As you can see this is not an exception but a routine practice by some hams. Should we print their calls in a magazine for others to know and to clean things up?

JAPAN ON TOP BAND

According to CTBN all active JAs were able to work 121 countries on 160 from 1964 till April 1985. Here is the map of JA districts and some prominent and regular 160 m stations.

It is hard to work DX on 160 m from Japan for the following reasons: They have to operate split 1.8/1.9 MHz. There are fewer countries active in the vicinity of Japan. Bad QRM from LORAN in the direction of Europe and Africa on 1850 kHz. Some DXpeditioners don't know about the best propagation path and openings to Japan or they don't pay any attention to working JAs. They missed out for example on the following: ZK2, 3D2, KH8, VR1W, VK/LH, ZL8, ZF, KV4, FO8, ZM7 etc. Some top band contests are starting and

1986 CQ WW CW J6DX gang: Left to Right: Red, W8RKL; Keith, K6GXO; Chuck, NC8Q; Steve, WD8IXE; Roy, W8PR; Bob, WB8ENR; Ron, W8ILC; Bill, W8WPV; Scott, N9AG; Frank, W8OK

ending at bad time for JA hams - especially CQ 160 m contests. Most of the 160 m contacts are all long haul DX and the absorption of signals is very high.

NEW SPEED RECORD

The shortest time that anyone has worked 100 countries on 160 m is two months - by John, ON4UN. This record was helped by the fact that John was a new country for everybody and by his super operating skills and station setup.

The second one seems to be Glen, VE3ICR, who worked 100 countries between December 1984 and March 1985 using an Inverted L antenna. 6Y5NR/KP1 - Navassa Island was his No. 100.

Anyone else out there with a better time?

Wally, W8LRL says that: "I think that almost any country in the world can be worked on 160 if both operators are at the right time" (with right equipment and antennas).

CLEAR FREQUENCIES IN ENGLAND

According to G3PQA those are the clear frequencies on the NW coast of Europe and England:

1806 kHz	clear at times (not in LZ)
1810	partly
1811-1812	clear (partly in LZ)
1820-1822	sometimes (clear in LZ)
1823-1824	mostly if no rtty or carrier (clear in LZ)
1826	clear (LZ too)
1830-1831	DHJ and OSN beacons (same LZ)
1832-1835	DL SSB (same LZ)
1836-1839	NITON radio - Bristol Channel 30% of the time (clear LZ)
1840-1849	French SSB and commercial QRM clear between 0230-0600Z (clear in LZ if no Eu QRM)

TREES = DUMMY LOADS

Mike, GD4BEG shares his experiences with "tree" problem. He says that they can have a good or bad effect on 160 m operation, depending on circumstances, but generally bad. They are "vertically polarized" dummy loads and suck up the signals in their vicinity. Anyone else experimented in this area? Please let us know.

J6DX IN 86 CQ WW CW

Scott, N9AG informs about the Southwest Ohio DX Association operation during the CW part of CQ WW contest from St. Lucia. Operators were: W8RKL, K6GXO, NC8Q, WD8IXE, W8PR, WB8ENR, W8ILC, W8WPV, N9AG, W8OK assisted by J6LA, J6LGH, L6LCT, AA4VK and N8BJQ. Being mainly DXers and so-so contesters, their effort produced a super score of over 14 million points.

On 160 m they made 617 contacts, worked 20 zones and 59 countries using ICOM IC751 and Dentron MLA-2500 amplifier running 500 W due to a low AC voltage. The antenna was an 80 m dipole with coax braid and center conductor tied together and fed as a long wire antenna. The highest point of the antenna was 9 meters. The location was near the top of a 170 m high hill about 200 m from the ocean on the North side of St. Lucia having a clear shot at JA, N.America and Europe. Magic ears of Ron, W8ILC nailed 84 contacts in the first hour using a straight key!

N9AG is comparing their effort to the famous P42E, which is difficult to do because of difference in the activity levels now and then.

CQ 160 M CW CONTEST

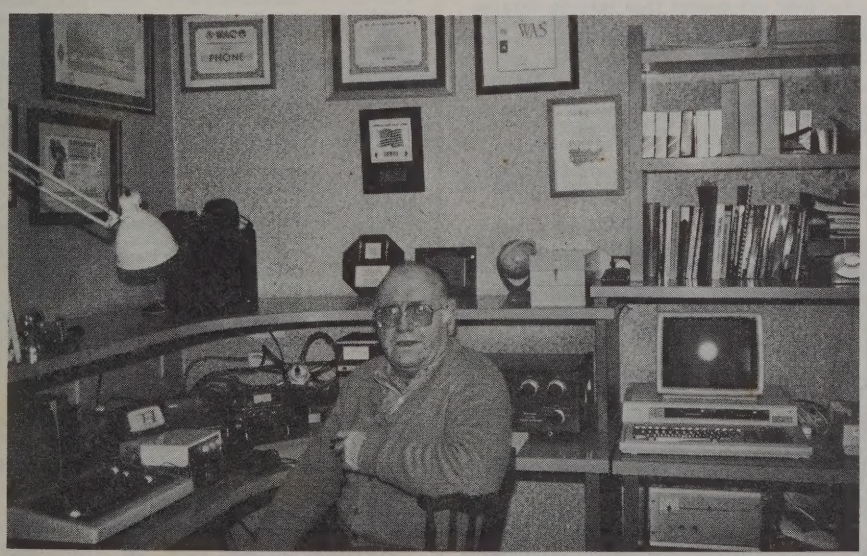
Unfortunately I was not able to participate in this one because of my commitments at the Dental Clinic on Saturday, but we have a report form LZ1KDP and EA3VY. Jose worked more than 30 US stations, plus KL7, KP4, YV, HK and others in spite of poor conditions.

At LZ1KDP, the famous four element bidirectional switchable antenna was not available anymore, they installed a 160 m long wire antenna directed at Japan. They were on more for fun than for blood and netted 550 contacts with over 50 countries including 25 JA and 38 USA contacts. This must have been also the most eastern European QSO for Dan, KL7Y. They worked the following W/VE stations: K2EK, W3BGN, W8UA, VE1ZZ, N2AA, N4XR, AA1K, K3JLT, KM1H, N4XC, K3ND, N4WW, K5NA, KT3M, W9AZ, N5RZ, VO1MP, W3GM, WB3CAC, W3FV, K4JPD, W2GD, K2GM, VE3WT, W3GU, KS1J, K1MM, W3UM, VO1HP, N2MM, VE1ASJ, W1IS, N4PN, KA1SR, KS8S, W3LPL, K4UEE, K4LTA.

The following prefixes were active: CT, DL, EA, EA6, EI, F, G, GW, GM, HA, HB, I, JA, KP4, KL7, LA, LZ, OK, OE, OH, ON, OZ, PA, SP, SV, SM, YV, HK, Y2, VS, 4X, 9M2, EA8.

DXCC 160 STANDINGS

N.America (QSL/WKD)	1.	W8LRL	198/204
	2.	N4PN	181/184
	3.	VE1ZZ	176/188
	4.	W4DR	171/174
	5.	AA1K	169/179
	6.	WØZV	162/165
	7.	N4WW	159/173
	8.	K1MM	156/162
	9.	K8MFO	146/153
	10.	W1JZ	140/148
Europe	1.	G3SZA	182/188
	2.	PAØHIP	181/185
	3.	UT5AB	148/153
	4.	HB9AMO	141/148
	5.	DJ9WL	140/150
	6.	DL9KR	134/136
	7.	GD4BEG	129/131
	8.	SP5INQ	120/130
	9.	LZ1KDP	115/137
	10.	LZ2CJ	115/127
	11.	ON4UN	?/125
Asia	1.	UG6GAW	149/154
	2.	4X4NJ	144/154
	3.	JA1GTF	137/150
	4.	UA9CBO	112/126
	5.	JA5DQH	DXCC/?
	6.	JA2GQO	DXCC/?
	7.	4Z4DX	DXCC/?
	8.	RA9AKM	66/99
Oceania	1.	VK6HD	101/108
	2.	ZL3GQ	DXCC/?
	3.	VK5KL	?/41
	4.	VK3QI	?/23
	5.	VK9NS	?/23
	6.	P29PR	?/20
WAZ 160 M	1.	G3SZA	39/39
	2.	PAØHIP	39/39
	3.	HB9AMO	35/38
	4.	K5UR	35/35
	5.	WØZV	35/35
	6.	SP5INQ	33/36
	7.	DJ8WL	32/32
	8.	4X4NJ	30/35
	9.	LZ1KDP	30/35
	10.	LZ2CJ	30/32
	11.	ON4UN	?/37



Jose Mata Garriga, EA2VY in his shack

...and his antenna farm

Here they are: As advertised - sign up for Ham Radio Magazine and you will get 2nd OP free. You can choose the second operator from those first class low band operators: (L. to R.: Rich Rosen, K2RR, Craig Clark, N1ACH and Riki Klein, 4X4NJ

JOSE MATA GARRIGA, EA3VY

EA3VY is a very familiar callsign to many top band DXers. Jose is 62 years young and was first licensed as EA8BO back in 1950 (before I was born, Hi). He returned to Spain in 1979, to his present countryside location. Jose is a Chemical Engineer and has 5 children and 4 grandchildren. His other hobby is machine code programming for the computers.

EA3VY pretends to be not too much interested in DXing, but rather an antenna experimenter and enjoys working difficult path contacts. He says he is not interested in awards and that is perhaps the reason he is so slow with QSLing. He knows he has about 100 countries confirmed and about 150 worked on 160. He is up every morning at the sunrise and calling for the West Coast US. Another difficult path for him was to ZL, but after making first couple of contacts, he was able to work ZL2BT more than 70 times since.

Jose is using four halfwave slopers with top ends at 40 m level and low ends at 20 meters off the ground. All are Zepp fed at the support tower with 600 Ω stubs and have individual tuners. His soil has very poor conductivity and he has never had good results with verticals! His slopers are also used on receive, but he wants to try the Beverages very soon. (With poor ground, he should!)

Jose is not too hot with CW yet, but he invites young operators for the CW contests, thus helping them to become more skilled and interested in top band operating.

ACTIVITY REPORT

There is a so called VOICE DX BANK in London, England. Everyone can record the DX information over one telephone number (0044-1-7257374) and listen to it on another number (0044-1-7257373). Most of Europeans use this service to arrange the schedules or to exchange the DX information. There is one minute time limit on recording.

CE8ABF will soon go to Antarctica and plans to be active on 160 with 3G9CBY call.

LU6UO/Z was on from S. Shetlands till the end of March.

XF4DX expedition to Revilla Gigedo was on 1827 and listening for Europe on 1833, but there are rumors floating around that they did not have a landing permission, so they might not count for DXCC.

Activity reported on 4X4NJ 14.337 information net: 7P8BE 0330Z/1827kHz, 7S6FRO 2340/1836, 7X5AB 0556/1844, CO2PY 2346/1829, EI8H 2355/1850. EI9J 0539/1835, FG5AM 0343/1834, HBØ/DJ9YY 0705/1840, HH7PV 0430/1837, HKØHEU 0430/1837, J37AH 0319/1840, J73LC 0220/1840, KC6JC 0809/1839, KH6AT 0549/1831, KH9AC 0810/1827, PY1RO 0732/1833, RZ10WA 0630/1833, TF3KG 0145/1833, TI2CC 0333/1845, TI4SU 0300/1828, TI9W 0525/1834, VP2VI 0340/1829, YN3EO 0528/1832, ZD7CW 2308/1860.

VS6DO 2300/1832, VE1ZZ 2324/1832, 9M2AX 2344/1832, TR8JLD 2345/1827, KH9AC 1904/1832, 5N2BAV 0200/?, CP8HD 0830/1827 SSB, KX6DS 0730/1832, HK1AMW 2340/1830, P29PR 1200/1827, YN3EO 0600/1827, HI8LC 2340/1830, P29PR 1200/1827.

The band was opened from here to Ukraine during the middle of the day - 1300Z.

8Q7CH said on 20 m that he has a big problem with reception on 160 m. He was going to erect a full size 160 m dipole at 100 ft and he will be active on Mondays.

7Q7LW, Les said that he would try to put up an antenna for 160, but it is very difficult for him to do that.

L.to R. OH7RS, OH7UE, OH7MA, OH7VR, OH7YF

QSL INFO (Worldradio)

A61AB	—not IK8DYD	V44KA	—WN5K
A85G	—K3RB	V44KI	—NØDH
AP2SQ	—W3HNK	V44KT	—WA4WIP
C6ARD	—W2LZX	VK9LM	—OE1ZL
CN8AD	—F6JL	VKØDS	—VK9NS
CO5GV	—W3HNK	VKØGC	—VK9NS
CT3EU	—G3PFS	VP5DG	—WN5K
CU1CB	—N2DUR	VP8BFM	—GM4ILS
CXØXY	—CX2CS	VS6CT	—KA6V
DK9FE/OY	—DK9FE	VU4APR	—VU2APR (See Note 5)
ER3W	—UZ3AWA		
F6FVY/TU	—F2BS	VU4NRD	—VU2APR (See Note 5)
FM5BH	—W3HNK		
FOØSSJ	—K8JRK	VY1CA	—VY1CW
FOØWLV	—K8JRK	W1BIH/PJ2	—W1AX
H44AF	—N6NDH	W6ZH/KH8	—W6ZH
HBØNL	—HB9NL	WBØNAA/	
HBØ/HB9NL	—HB9NL	YN1	—NØBKL
HR6A	—WB5VZL	WE5P/J6L	—WE5P
HV2VO	—IØAOF	XE2VKR	—NN7A
I12ARI	—IK2BHX	XF4DX	—K9AJ
J6LIH	—W2GBX	XP1AB	—N8EAQ
J28EI	—F6CZB	XU1SS	—JA1HQG
J28EO	—F6FYD	YC7JUL	—KD7YO
J73D	—W2OB	YN3EO	—Y32KE
J74A	—K4LTA	YS1MAE	—WN5K
J88AR	—WA4WIP	ZF2JA	—WBØPWA
J88BK	—WN5K	ZF2JR	—N6RJ
J88BN	—WA4WIP	ZF2KD	—N5TP
JA2NQG/JD1	—JH1LKH	ZF2KE	—K9QVB
K2SS/VP2V	—WA6AHF	ZK1XC	—DL8QG
KC6CS	—JE1JKL	ZK1XY	—WØRLX
KD7SO/VP2M	—KA6V	ZY0SA	—PY1BVY
KH6GDR/T32	—KH6GDR	ZY0SB	—PY1BVY
KI4IW/C6A	—KI4IW	3A6E	—F9RM
KL7LF/KH3	—KL7VZ	3C1MB	—EA7KF
KN4BPL/KH3	—WB4MJH	3D6BW	—AK1E
KP2A	—N6CW	4K1H	—UY5OO
KX6OI	—KX6BU	4N7V	—YU7AJJ
LU1ZA	—LU2CN	4U1ITU	—(See Note 6)
N1EE/KH6	—N1EE	5AØA	—SP6BZ
N2GUV/KP2	—KU2Q	5B4LP	—F6FNU
N4RP/C6A	—N4RP	5H3RJ	—SM7HKJ
N6RA/V44	—N6RA	5L2GA	—KB6EH
OD5QS	—WA4VDE	5L2SI	—DJ6SI (See Note 7)
OX3LX	—OZ1DJJ		
P29RT	—W6FAH	5L2RL	—DJ6SI (See Note 7)
P40GD	—N2MM		
PJ1JP	—WA6PKN	5L8E	—GM4LDU
PJ7/WA6PKN	—WA6PKN	5T5NU	—F6FNU
TK5UC	—F6AOI	5T5SL	—DL8DF
TR8AHO	—DJ2VZ	5T5XX	—DL1VJ
TR8SA	—W6BF	5V7SA	—WB4LFM
TT8CF	—W3SN	5V7WD	—WB4LFM
TU4CG	—F2BS	5W1FZ	—ZL1CAD
TZ2XN	—DK3HL	7J1ACH	—NG7X
TZ6FIC	—FE6CRS	7P8DP	—W8MPW
V31AB	—WA4WIP (See Note 8)	8P9CW	—VE3CPU
	—N5DD	8P9HG	—VE5RA
V31DX	—WB8YUC	9J2EZ	—I4FGG
V31JQ		9Q5KI	—YU3KI

BY4RB	—P.O. Box 413, Zhen Jiang, PEOPLE'S REPUBLIC OF CHINA
C53BU	—P.O. Box 720, Banjul, THE GAMBIA
FH4EC	—P.O. Box 44, Dzaoudzi, 97610 Mayotte, via FRANCE
FY4EE	—P.O. Box 999, Cayenne, FRENCH GUIANA
HP1XOR	—PSP, Box 944, APO Miami, FL 34002
LU6FAZ	—P.O. Box 399, Santa Fe, ARGENTINA
LU6UO/Z	—GACW, Carlos Diehl 2025, 1854 Longchampe, Buenos Aires, ARGENTINA
TR8CR	—P.O. Box 4356, Libreville, GABON
TR8JJC	—P.O. Box 13398, Libreville, GABON
VQ9HW	—Wally Watts, Box 8-27, FPO San Francisco, CA 96686-1800
YI1BGD	—P.O. Box 5864, Baghdad, IRAQ
YI4AY	—P.O. Box 5864, Baghdad, IRAQ
YI9BIF	—P.O. Box 5864, Baghdad, IRAQ
ZL7DE	—Tony Magon, Radio Station, Waitangi, Chatham Islands, via NEW ZEALAND
3D2MR	—P.O. Box 271, Suva, FIJI
5T5RA	—R.W. Ackerman, c/o USAID Nouackchott, Agency International Development, Washington, D.C. 20523
5Z4DU	—P.O. Box 21355, Nairobi, KENYA
5Z4JB	—Julian Baldwin, American Embassy, APO New York, NY 09675
7P2BX	—P.O. Box 333, Maseru, LESOTHO
8Q7QL	—YASME Foundation, P.O. Box 2025, Castro Valley, CA 94546

5. When requesting a QSL card from either of these two stations, please include the suffix of the operator's call (if known) to help in the processing of your cards.

6. For contacts made during February 1987, send your cards via F6FHI.

7. It is reported that Baldur, DJ6SI, does not collect QSL cards. Therefore, just include the necessary log information on a slip of paper along with your SAE and IRC's or "Green Stamp".

8. If you live in Japan you may QSL via JA1ELY.

80 m DXing

John Devoldere, ON4UN, AA401

PO Box 41
B9000 Gent, Belgium

80 METER ACTIVITY

VU4APR deserves the credit for having tried night after night to please both the Europeans and North American stations with her daily appearance on 3695 mostly in company of VU2GDG. Gopal takes half of the credit for being such a good MC. I know not too many East Coast stations made it, but one cannot deny Barati has tried very hard. The week before and after the ARRL contest brought a good mixture of Caribbean/Central American countries on the air operating low bands: AI6V/6Y5, J74A, V31CV, HR6A, AA4NC/VP2M, K2KTT/PJ7 etc.

It must be admitted that the conditions were excellent around the ARRL contest weekend. But they dropped way down soon after the test (not enough ionization from the kilowatts?).

From Asia YI1BGD has made a few appearances with excellent signals in Europe (19:00 GMT). KC6MX (QSL K1MX) has been worked with 599 signals on 3505 at 2100 GMT (march 23).

Just like last month I have spent much more time on 160 than on 80 and must admit I have not so much to report. Sorry, switch with me to 160!

TOP BAND ACTIVITY

VU4ABR/RBI has been trying regularly on 1830/1834 around 23:30 but deliberate jamming has withheld Dave, G3SZA and Willem, PAØHIP from working their last zone on top band.

After W7AWA/OY we have heard OY9JD regularly on CW with very strong signals into Europe.

FM5WS has been a regular on 1845 around sunrise in Europe and has an excellent signal. More stations from the Caribbean/Central American area worked by your scribe were: 8P9HG (QSL VE5RA), HKØHEU (of course!), HH7PV (who else?), TG9NX (another beacon), TI2CC (also a regular), AI6V/6Y5, J74A (QSL K4LTA), V31CV (QSL N5DD), HR6A (QSL WB5VZL), J37AH (QSL W2GHK), CO2CB, FG/W3HNK/FS etc.

The first week after the ARRL contest things became very quiet on top band. It was like everyone (including the band) needed a rest.

As we are progressing into spring time, we got the occasional opening into South America: CXØXY (again on March 6th), PT7CB, PT7BZ, CP8HD, ZP5JCY.

C31CX was a pirate, obviously the same guy who impersonated 3A2EE (if he was a little smarter he should have known that C31 prefixes are not given to the foreigners!)

Since March 15th, we have been regularly plagued with high static in Europe. Here comes spring time, and the suffering time for our ear-drums!

I was all excited about the fact that Lloyd and Iris were in 5Z4 and as I was still missing that zone on top band. I inquired about 160 meter. The answer was: "QSL John, 73 QRZ."... I guess my 20 meter signal was too weak to understand my question. Another day on 20 meter SSB I asked again if they were QRV on top band. The answer was: "not now."??

Oh, by the way, I have never worked the Colvins on the low bands. Do they really ever operate the low bands?

Let's talk about a fantastic low band DXpedition: K1MM, K1MEM, K1ST and N1CPC went to Ivory Coast (TU4A) and had excellent signals on all the low bands March 16 - 20). Congrats! The first night they came on 1826 I heard them calling CQ for 1 hour (1930 GMT) but I could not reach them. Nobody else was calling them. I guess it was just too early. On their way back home, the group stopped in Senegal (K1ST/6W1) and knocked them off on 160 really well (March 22 - 26).

Another excellent DXpedition was 4MØARV. With Carl and Martha amongst the crew it had to be a good one! All low bands were given a more than fair share of the operation (March 18 - 26).

I don't know how he does it, but Jim, VP2ET (QSL K5RX) has had by far the outstanding signal from the Caribbean the past few weeks. He has been S9 plus all the time both on CW and SSB.

Rudy, DK7PE has continued from his 3A operation (march 3) down South and has activated C56/DK7PE around march 21st, and was supposed to go to 6W1 next.

5T5NU was worked by LZ2DS and CT1FL on march 22nd on SSB (1845), but the signals were weak. Your scribe has heard US-stations working A25/VE3FXT but never heard the station itself. I had a 3 day sked around 23:00 GMT but no results. Sorry George (for me?).

Since march 19, OSN beacon frequency has moved from 1831 to 1832.5 kHz. This has changed our habits a little. The best CW window now is 1831.5 to 1832.0.

8Q7CH has an excellent signal on top band but has some problems with QRM to a local coastal station. Ken accepts skeds, even by telephone! (QSL SM5DQC).

I guess the winter propagation to the US is over now (march 23), and I will have to wait until next winter to work my remaining three states (Utah, Wyoming, Idaho).

On the other hand the skip is moving South and two of the missing zones (zone 39 in Africa) and 12 (South America) should be within reach during the next weeks or months.

5H3ZO (QSL KØSLT) is mostly active on CW and AMTOR (selcall HHZO standby Kon 14080.6 LSB) and gladly accepts skeds for top band. Although Pat is only using 100 Watt and a G5RV (everything strapped together and fed via a tuner) he was peaking 599 on 1830 CW (march 25th), and the same strength on 3501 a few minutes later. He has promised to try top band more often, but prefers skeds arranged via his AMTOR station. I later found what must be the reason for his good signal into Europe: his antenna is less than 100 meters from the Indian Ocean, and looking North there is only the Ocean! Who would not like a QTH like that?

KC6MX gave Pierre, HB9AMO his last zone for 160 meter WAZ . Congrats Pierre! After having worked KC6MX myself on 160 (2045 GMT, march 26), we QSYd to 3502 where both 160 meter QSO's were confirmed.

SU1ER, Azat, has problems with his 160 meter antenna, but he hopes to have it fixed within a months or so. Despite a 5/1 SWR Azat was 449 on march 27 (zone 24).

DJ6QT/9L1 showed up on 160 on March 27 at 1900 GMT and your scribe had the honor of being his first top-band QSO. Walter used a dipole at 24 meter and a 750 ft long Beverage antenna aiming North.

The CQ WW WPX contest (March 28 - 29) brought the following interesting stations * are new countries for your me): UP7A, HV3SJ (*), PJ7A (*), EA9AM, SV1RK, VP2EC, LX5ØRL (QSL LX1RQ), OH1RY/CT3, OH3TQ/OHO, OHØ/G4JVG, SV8CS, UL7ACS and many other USSR stations. Conditions were extremely poor the second night of the contest. By far the strongest station from North America was VE1BNN.

SVØAC/9 (QSL AA4LU), Mike from Crete had a good signal on CW and SSB (1830 and 1838) during the CQ WW WPX contest. He gets out well with a roof-mounted Butternut, but is plagued with a S9-plus power line noise.

At time of writing (March 30), my top band score is :125 countries and 37 zones (still 47 states). I would like to thank my many friends helping me with information about 160 meter activities, especially PAØHIP, G4VGO, HB9AMO and F6BKI.

ANTENNA HELP

You would not believe how many letters I get with request for advice on low band antennas. Nothing is more difficult as giving such an advise if one has not really seen the place. Typical questions are:

"I have a 250 KV line North of me at 500 ft, and 2000 ft mountains in all other directions within a mile. The ground is rocky, and I cannot put up a support higher than 60 ft. The QTH is on a 1 acre lot, and there is no room for long wires or Beverages. Please tell me John how I can hear the world and work the world on top band...," or

"John, please send me any information about antennas for 160 and I will put one up soon..."

I wish I could be of real assistance to all those needing good advice. I know that in many cases the advise would have to be "try another QTH." As a general rule I would advise against the use of horizontal antennas if you want to work DX, unless you can have it up at least 100 feet. Any sort of Vertical will usually do better. Even a Butternut with a decent radial system. One system worth considering is an inverted-L even with a single radial. Look at it as a dipole, with one leg on the ground (the single radial), and part of the other leg vertical, and the remaining leg horizontal. This is a wire set-up, and can be a good idea for DXpeditions as well. OZ8BV had tremendous results with such an antenna on 80 meters. The best thing is to experiment and see what works for you best. 73 (ON4UN)

6 m Corner

Harry Schools, KA3B

1606 S Newkirk St. Philadelphia, PA 19145

ANTENNAS

The antenna is the most important component of any amateur radio installation because even with a high powered transmitter, a less than adequate antenna will produce less than adequate results. For operation on the 6 meter band the general rules are to mount the antenna as high as possible and to feed it with low loss coaxial cable or hardline.

Antenna height is important for two reasons. First, 6 meters is a VHF band and to ensure reliable groundwave communication out to a few hundred miles antenna height is a must. Also, an antenna mounted up at 90 to 100 feet will prove beneficial when attempting to work low angle DX during F-2 openings. Secondly, increasing the height above ground and above the plane of nearby TV antennas will almost always helping reducing any possible TVI problems, especially at higher power levels. Unfortunately, most of us aren't in a position to mount antennas up as high as 100 feet. At my QTH in the center of Philadelphia, I utilize a 3-element beam at 35 feet with 10 watts of power. With this installation (in a poor VHF location) I can work groundwave out to about 150 miles. Working DX isn't much of a problem as long as I can crack through any pile-ups.

The next most important consideration is the use of good quality low loss transmission line. If the length of transmission line is under 50 feet the use of RG8X (Mini-8) or RG-213/U is suitable. However, longer runs should be of cable such as or equivalent to Belden 9913. Cable such as this exhibits around 0.9 dB loss per 100 feet. Also, its excellent quality shielding will aid in the suppression of TVI.

Cable attenuation at 50 MHz in dB per 100 ft.

RG58A, RG58C	3.5 dB
RG58, RG58B	3.2
RG59, RG59A, RG59B	2.7
RG8, RG8A, RG213	1.7
RG8 FOAM DIELECTRIC	1.2
BELDEN 9913	0.9
1/2" 50 OHM HARDLINE	0.5

The accompanying chart of 6 meter beams are those that are currently available on the market. Other antenna manufacturers such as Mosley and Hustler also have beams available but I did not list them since I did not have the specifications handy.

About 95% of all 6 meter SSB/CW work is accomplished with beam antennas in the horizontal polarixation. For those unfortunate soles who are unable to mount such antennas, verticals, dipoles and halos are in order. Although verticals are practically useless for local work due to a 20 dB cross-polarization with omni-directional coverage, then halos would be a good choice. Single ring halos and Cushcraft's old "Squalo" (which is a square halo) can be found at hamfests for a few dollars a piece. Their only drawback is that they are antennas that exhibit "unity gain." Probably the most efficient halo ever manufactured was Hi-Par's Saturn-6 Halo. This antenna was unique in that it had three rings instead of the usual one ring. Unfortunately, Hi-Par Products of Fitchburg, Massachusetts fame hasn't been in business for years. Therefore, the Saturn-6 Halo is a much sought after antenna. They are rarely seen at hamfests and most hams who are lucky enough to own one rarely part with them.

UPCOMING DXPEDITIONS

Spring is here in the Northern Hemisphere and this means that the 6 meter DX season can't be far behind. Already the rumors are flying concerning the travels of Jim Trybig, W6JKV. Last year Jim made two very successful trips to St.Vincent (J88) with Dick Hanson, N4HSM and to the Azores (CU2) where he was assisted by Kal Hubler, KB6AFZ. Up to this point in time I have heard through the grapevine that Jim will visit one of the following: Navassa, Clipperton, Senegal or Sierra Leone. I have just written Jim a letter and I am hoping for a quick reply so I'll have a chance to publicize his DXpedition.

Other DXpeditions that will take place and may coincide with the ARRL June VHF Contest on the 13th and 14th, will be Martinique (FM) and either Guadeloupe (FG) or St. Martin (FS). The Martinique operation is tentatively scheduled to have WA1AYS, K1FJM and AJ1E as its operators. The North Jersey DX Association (probably W2QM) will be on from FS. The Guadeloupe operation is only a rumor at this point and will be put on by a group of W4's.

GIBRALTAR BEACON

The Gibraltar beacon (ZB2VHF) on 50.035 MHz has been moved form the QTH of ZB2BL at 500' ASL to the top of the "Rock" at 1,000' ASL. The beacon runs 35 watts and now has softer keying to prevent splatter to nearby ZB's. The grid square is IM 76.

ISLE OF MAN

Jim, EI9D has recently moved from Ireland to the Isle of Man where his new callsign is GDOGBA. Jim was one of only three 6 meter operators in Ireland. He is a very active operator and with his move to the Isle of Man, it should give many the opportunity to add a new country to their list.

UNITED KINGDOM 6 METER BANDPLAN

The UK bandplan for their 50 - 50.5 MHz band is as follows:

50.0 - 50.1	CW ONLY
50.2 - 50.8	BEACONS
50.110	WORLDWIDE DX CALLING FREQUENCY
50.1 - 50.4	NARROWBAND MODES
50.200	SSB ACTIVITY CENTER
50.300	CW METEOR SCATTER
50.350	SSB METEOR SCATTER
50.4 - 50.5	ALL MODES

The D.T.I. has not made any changes yet in the regulations governing 6 meter operation.

UNITED KINGDOM 6 METER GROUP

The Group's newsletter "Six News" is available by writing to its editor: Maureen Wright, GW8ZCP, 6 CWM Eithin, Wrexham, Clwyd, LL12 8JY.

NORTH AMERICAN ACTIVITY

In my previous column I covered those stations that were active in Alaska and the Canadian Maritimes. This time around I will profile Western Canada and the States of North and South Dakota. Each month I will try to cover a different area of the United States and Canada in order to help those trying to achieve Worked All States or the Canada Award.

MANUFACTURER	MODEL	ELEMENTS	BOOM LENGTH	WEIGHT	WIND AREA	BAND WIDTH	CLAIMED GAIN
CUSHCRAFT	A50-3	3	6 FEET	7 lbs	1.8 FT	1 MHz	8 dB
CUSHCRAFT	A50-5	5	12 FEET	11 lbs	2.74 FT	1 MHz	10.5 dB
CUSHCRAFT	A50-6	6	20 FEET	18 lbs	4.46 FT	1 MHz	11.2 dB
CUSHCRAFT	617-6B	6	34 FEET	26 lbs	4.8 FT	1 MHz	14 dB
MIRAGE/KLM	6M-5	5	11.75 FEET	9 lbs	1.7 FT	2 MHz	9.7 dB
MIRAGE/KLM	6M-7LD	7	20 FEET	12 lbs	2.5 FT	1 MHz	10.5 dB
MIRAGE/KLM	6M-7LB	7	25.75 FEET	22 lbs	3.0 FT	2 MHz	11.5 dB
HYGAIN	64BS	4	12 FEET	10 lbs	1.1 FT	2 MHz	12.7 dB
HYGAIN	66BS	6	24 FEET	NA	NA	NA	15.0 dB

NORTH AMERICAN 6 METER (50 MHZ) BEACONS

(1)	50.045 MHz	OX3VHF	Julianehaab, Greenland	GP 60	20 Watts	Ground-plane	(c)
	50.048 MHz	VE6ARC	Grand Prairie, Alberta	DO 05	50 Watts	Ground-plane	(c)
	50.060 MHz	WA8ONQ	Middletown, Ohio	EM 79	2 Watts	Turnstile	(c)
	50.062 MHz	K1NFE	Burlington, Connecticut	FN 31	15 Watts	Turnstile	(c)
	50.062 MHz	W3VD	Laurel, Maryland	FM 19	10 Watts	Vert dipole 40'	(c)
(2)	50.063 MHz	N4PZ	Sarasota, Florida	EL 87	400 mW	¼ wave whip	(c)
	50.064 MHz	N7DB	Boring, Oregon	CN 85	30 Watts	Unknown	(c)
	50.065 MHz	W5VAS	Bohemia, Louisiana	EL 59	1 Watt	Halo @ 175'	(c)
(3)	50.065 MHz	WØIJR	Aurora, Colorado	DM 79	20 Watts	2-ring halo	(c)
(4)	50.065 MHz	KAØCDN	Aurora, Colorado	DM 79	20 Watts	2-ring halo	(c)
	50.067 MHz	WB8IGY	Loveland, Ohio	EM 79	2 Watts	Vert @ 120'	(c)
	50.067 MHz	WA6IJZ	Oxnard, California	DM 04	7-70 Watts	Vertical	(c)
	50.070 MHz	W4HHK	Collierville, Tennessee	EM 55	2 Watts	Sloping dipole	(c)
	50.070 MHz	WB4GJG	Danville, Virginia	FM 06	1 Watt	Ringo @ 70'	(I)
	50.070 MHz	KA4VEY	Harvest, Alabama	EM 64	10 Watts	Vertical	(c)
	50.070 MHz	W2CAP	Cape Cod, Massachusetts	FN 41	15 Watts	Vert dipole200'	(c)
(5)	50.070 MHz	KS2T	Toms River, New Jersey	FM 29	Unknown	Unknown	(c)
(6)	50.070 MHz	WA7ECY	Troutdale, Oregon	CN 85	10-30 Watts	Vert J-pole	(c)
	50.070 MHz	WØBJ	North Platte, Nebraska	DN 91	5 Watts	Turnstile	(c)
	50.070 MHz	WBØCGH	Lewisville, Texas	EM 13	1½ Watts	Halo @ 100'	(c)
	50.072 MHz	WA2YTM	Canandaigua, New York	FN 12	15 Watts	Turnstile	(c)
	50.077 MHz	NØLL	Smith Center, Kansas	EM 09	3-20 Watts	Halo @ 30'	(c)
	50.077 MHz	N5JM	New Orleans, Louisiana	EL 49	2-3 Watts	Coaxial Vert 80'	(I)
	50.080 MHz	WB4OOJ	Tampa, Florida	EL 87	10 Watts	Vertical @ 25'	(c)
(7)	50.080 MHz	W1AW	Newington, Connecticut	FN 31	50 Watts	6 ele beam/West	(I)
(8)	50.086 MHz	VE2STL	Val Belair, Quebec	FN 46	1½ Watts		

(c) Continuous Duty (I) Intermittent Duty

YUKON: CP 20 - VY1AU, VY1BQ, VY1CW

BRITISH COLUMBIA: CN 89 - VE7ADB, VE7AFB, VE7AFL, VE7ASI, VE7AXY, VE7BLF, VE7BN, VE7CJF, VE7SL. CO 83 - VE7IG. CO 95 - VE7EME. DN 09 - VE7BEE, VE7EKH, VE7ASY, VE7PRC.

ALBERTA: DO 05 - VE6NM. DO 21 - VE6KQ, VE6SW, VE6XT. DO 22 - VE6BCC. DO 30- VE6COH. DO 33 - VE6BCC, VE6BEU, VE6CX, VE6JW, VE6UV.

NORTH DAKOTA: DN 85 - WDØEMY. DN 96- KVØR. DN 98 - WØOSP. EN 16 - KØALL, KNØA, WAØFDV. EN 17 - WAØCSL. EN 18 - WAØYSF.

SOUTH DAKOTA: DN 83 - KAØEER, WØBLK. DN 84 - KØODY, NR5A/Ø, WØPUF, K1LL/Ø. EN 04 - WBØLX. EN 05 - KØEIC, WAØUWA. EN 13 - KØFKJ, WØZWY, WØSD, WBØHHM. EN 14- KØDEL. EN 15 - WBØSUW.

BEACONS

A major problem with preparing beacon lists is that there is an abundance of misinformation appearing in VHF newsletters and being passed by word of mouth. Information on beacons regardless of what bands they may be operational on can change often as most of the beacon custodians are continually experimenting with various antennas and operating output powers. Because of this situation, beacon lists have a tendency to become obsolete as soon as they appear in print. The enclosed beacon list is for North America only. Any and all information concerning beacons worldwide would be welcome.

Beacon notes:

1. The OX3VHF beacon was once operated by OX3BX in Danmarkshavn. Tommy, OX3BX now resides in Spain under the call OZ2BQ/EA7. Herluf Rasmussen, OX3RA now has permission for the beacon. It is located on the Island of Simiutaq which is about 30 km northwest from Julianehaab in grid square GP 60 qq (ASL 100m).

2. The 1/2 wave whip employed by the N4PZ beacon is mounted inside the window of an 11 story office building in Sarasota. Address is POB 15842, Sarasota, FL 33579.

3. WOIJR and KAOCDN are the same beacon. They are husband and wife respectively and they alternate callsigns weekly. Reception reports are confirmed with a very nice "beacon" QSL.

4. Jay, KS2T is presently looking for a new sight for his beacon. No further info at this time.

5. The WA7ECY beacon operates weekends and evenings until 10:00 PM Pacific Time and 24 hours a day during June and July.

6. The W1AW beacon is operational during bulletin transmissions and code practice sessions. Consult QST Magazine for these times.

7. VE2YB says that the VE2STL beacon is operational depending on band conditions but is normally on from 1200 - 2400 UTC. He is presently looking for a new site.

That should about do it for this month. I would like to thank Bud K2YOF and Steve W2CAP for providing me with the information for this column. Any and all info concerning 6 meter operation is welcome, especially photos. Until next time....73 (KA3B)

FIRST U.S. MONOBAND KING?

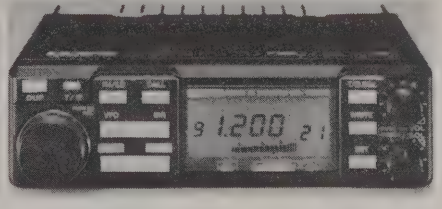
Howard Sheperd, W6US has accomplisheded winning all single band categories in the CQ WW contest from the 6th call area. Howard used various callsigns: W6QJW, K6UF and W6US. He believes that this might the "first" such a record for the U.S. districts. His results were: 28 MHz Phone - 1971, 21 Phone - 1969, 14 Phone - 1975, 7 Phone - 1970, 3.5 CW 1981, and 1.8 Phone - 1985. He will go after the 3.5 Mhz bit on Phone in order to have a "pure" play. Anybody else?

NEW ICOM IC-375A TRANSCEIVER

ICOM introduces the first 220 MHz base station transceiver which covers 216 -230 MHz and has 99 tunable memories, passband tuning, a notch filter, noise blanker, built-in SWR bridge, semi and full break-in and a multi-function meter. It has also smooth tuning knob and amber LCD readout with variable backlight. Four scanning modes for the memories are available. All subaudible tones are built in and the actual tone frequency is displayed. Standard repeater splits are built-in and odd splits are programmable.

The output is 25 watts and the design is similar to ICOM line-up of IC-735, IC-275 and IC-475. The IC-375A will be available in June 1987.

ICOM IC-1200 transceiver



ICOM announces new compact 1.2 GHz transceiver for mobile or base operation. Ideal for novices under new enhancement program and covers 1240 - 1300 MHz.

Featuring a simple to use front panel and large LCD readout with an automatic dimmer circuit, has 21 memories, ten watts output power, subaudible tones built-in, frequency and memory scan.

IC-1200 incorporates the AFC function that automatically tracks the frequency of the transmitting station.

The new options are the UT-28 digital code squelch and the UT-29 tone squelch to encode/decode subaudible tones. The IC-1200 will be available in May.

1986 CAN-AM CONTEST

Yuri Blanarovich, VE3BMV/W2

TROPHY WINNERS:

CANADIAN CHAMPION, SINGLE OPERATOR COMBINED, ARRL TROPHY: Wilf Barby, VE7QO

AMERICAN CHAMPION, SINGLE OPERATOR COMBINED CRRL TROPHY: Richard Hallman, KI3V/7

CANADIAN CHAMPION, MULTI OPERATOR ALBUQUERQUE DX ASSN. TROPHY: Kelly Taylor, VE4ALO

AMERICAN CHAMPION, MULTI OPERATOR IRSA TROPHY: Mike Fulcher, KC7V

The 1986 edition of CAN-AM contest ran both parts-phone and CW on a same weekend. Propagation was not all that great. Many stations commented that 10 and 15 meters were practically out of commission. Participation and amount of fun in a contest is directly proportional to the amount of activity, which depends on the propagation conditions. We hopefully hit the bottom of the sunspot cycle and by the fall of 1987 we should start claiming up and have more fun in the contests and on the bands generally.

The big winner of the Multi Operator category trophy, sponsored by the International Radiosport Association was Mike Fulcher, KC7V together with Lee Finkel, KY7M, who piloted the KC7V station into the number one score. Their station equipment included 5 element 20 m beam at 120 feet, 3 el. 40 m beam at 110 feet, 6 element 15 at 52 and 5 el. 10 at 60 feet. Butternut Vertical was used for 80 and 160. Rig was Kenwood TS930S and Henry 2K4 amplifier. KC7V won both categories - phone and CW by a nice margin.

The number two was Hal Blegen, WA7EGA station, operated with a help of WB7RBJ, W7TJ, NQ7M, NR7B and KC7MM a very nice effort with computerized log.

The Canadian Multi Operator Champion trophy, sponsored by the Albuquerque DX Association, goes to Kelly Taylor, VE4ALO and his helper VE4VV, who produced the highest score from Canada. The second place was taken by Vitaly Markasin, VE6JO, and his XYL, who helped with logging and duping.

The highest single operator score was produced, and American Champion Trophy, sponsored by the Canadian Radio Relay League, goes to Richard Hallman, KI3V/7. Richard really likes operating domestic contests from the West Coast and we should see him more often on the top of the contest results. The second place was taken by John Hawkins, K5NW, while William Petlowany, KV6H finished third.

The Canadian Champion Trophy, sponsored by the American Radio Relay League was won by Wilf Barby, VE7QO, who was the highest scoring single operator Canadian in both modes. Jim Wade, VE1DH came second and D.R.B. McArthur, VE6DZ was third.

The West Coast stations traditionally dominated the single operator CAN-AM scores, this contest was no exception. Propagation on higher bands favors the west coast stations allowing them to clean up the higher density East Coast. If there was more activity on low bands, the East Coast should have advantage there. KI3V/7 and KV6H topped the single operator list on phone, while N6OP and K5NW on CW. Canadians had VE7QO, VE7DLM and VE1DH leading the phone mode, while VE7QO, VE3KP and VE1DH topped the CW part.

Single band category in this contest lumps all bands together and this year's phone winner from USA was KE7KF operating 40 meters, with NK7L and AG7M with 20 m entries behind him. The CW part was won by W5ASP, ahead of NM2L and WS4E. The best in Canada on phone were VE3OZB on 40 meters ahead of VO1QU and VE1AGZ. The CW part was won by an American in Newfoundland KA9LXP/VO1 ahead of VE3OEQ. This year the 40 meter band was good to single band operators.

The highest scoring QRP station from USA was KH6CP/1, who won both modes ahead of KB4GID. The Canadian phone saw one lonely entry from VE2AEJ/3, while CW was taken by VE3OOL.

Using the official forms for our (or any) contest helps greatly not only the sponsors and log checking process, but also the contesters. Our forms are well designed and our dupe sheets probably the best around. One page takes care of all Ws and VEs and gives a picture of density of stations worked by the call areas. It makes logging and duping a lot easier. Some people use their own designs, quite often two to three times larger than ours. It is not mandatory to use our forms, but I think it is in the interest of each contester to use them, they make contesting easier and more fun. The forms are available for asking, please send business size SASE.

It also helps to read the rules before the contest. We had some stations "overlooking" that you can work your own country, or that multipliers count on each band. Don't be ashamed to send your log in, even if the score is not the record breaking one. Your log is needed for the checking purposes and you just might win our beautiful certificate. Certificates (including the last year's) should go in the mail by the end of the May. We have new certificates printed and our computer program should be capable to fill them in from now on.

Many commented that they prefer the "old," split weekend format. This year we are returning to separate weekends per mode and the Saturday 1800 UTC starting time. This should minimize the collision with other contests and allow more time to be spent with your family over the weekend.

There are other changes in the rules: We are removing the mandatory rest time for the single operator stations, now you can operate the full 24 hour periods. We are adjusting the point value for the SSB contacts to 1 point for the own country and 2 points for the "other" country contacts, while CW QSOs are worth 2 and 3 points respectively. This should bring the SSB and CW scores more on par for the combined mode competition.

We are looking for more sponsors of the trophies. If you would like to sponsor one, please contact the contest chairman.

We congratulate the winners and thank all the participants. We hope that improving propagation conditions will increase the participation and bring you more fun.

Please mark your calendar with the dates of 1987 CAN-AM Contest: Phone part starts on Saturday, September 19 at 1800 UTC and CW part starts on Saturday, September 26 at 1800 UTC, full 24 hours till Sunday 1800 UTC.

(Comments are listed after the Contest Calendar)

Result listings. Combined mode: Place, callsign, multiplier area (state, province), category (A - all band, Q - QRP, 7 = 7 MHz single band, M - multi operator), * denotes certificate winner, combined score, phone score, CW score.

Phone and CW listings: Place, callsign, multiplier area, category, * if certificate winner, score, number of QSOs, multipliers. (VE3BMV/W2, Box 282, Pine Brook, NJ 07058)

1986 CAN-AM RESULTS

AMERICANS COMBINED SINLE OP

1	KI3V/7	NV	A *	400595	290195	110400
2	K5NW	TX	A *	212870	35535	177335
3	KV6H	CA	A *	150776	146520	4256
4	N1CC	CT	A *	150125	104646	45479
5	K9LJN	IL	A *	122427	1911	120516
6	W6UQF	CA	A *	109338	26862	82476
7	WC4E	FL	A *	106805	48425	58380
8	WA1JVV	VT	A	49136	7826	41310
9	NV7R	MT	A	36961	26202	10759
10	KW2J	NY	A	34818	308	34510
11	W3ARK	PA	A	30344	11169	19175
12	W2DW	NY	A	29218	3658	25560
13	WBØYJT	KS	A	27027	15960	11067
14	KH6CP/1	CT	Q	24085	3675	20410
15	KB4GID	GA	Q	19236	1296	17940
16	N5IJI	OK	A	18316	8436	9880
17	W3SOH	VT	A	17475	3780	13695
18	N6NF	CA	Q	17344	704	16640
19	NØFFZ	CO	A	17055	2128	14927
20	WA2LBT	NJ	A	10242	90	10152
21	KA1LMR	NH	A	8716	5476	3240
22	AL7CQ	AK	A	7088	403	6685
23	N2FZJ	NY	A	6915	1587	5328
24	N2FBV	NY	A	5972	1725	4247
25	KJ4WH	FL	14	5252	3472	1780
26	W5NR	TX	A	4700	252	4448
27	WBYGR	OH	A	1344	252	1092
28	N3CZB	PA	14	1080	352	728
29	K7RJ	UT	1.8	296	140	156
30	KB8AC/9	IN	1.8	39	27	12

AMERICANS COMBINED MULTI OP

1	KC7V	AZ	M *	489900	283500	206400
2	WA7EGA	WA	M *	358194	209568	148626

CANADIANS COMBINED SINGLE OP

1	VE7QO	BC	A *	280792	159572	121220
2	VE1DH	NB	A *	204947	111051	93896
3	VE6DZ	AT	A *	89423	59228	30195
4	VE3AXV	ON	A *	61329	17493	43836
5	VE3CWE	ON	A	25551	3978	21573
6	VE3MFA	ON	1.8	6693	5037	1656
7	VE7IQ	BC	A	4733	1037	3696
8	VE2AEJ/3	ON	Q	323	203	120

CANADIANS COMBINED MULTI OP

1	VE4ALO	MB	M *	335405	165352	170053
2	VE6JO	AT	M *	234737	138528	96209

PHONE - AMERICANS, SINGLE OP - ALL BAND

1	KI3V/7	NV	A *	290195	1102	127
2	KV6H	CA	A *	146520	639	110
3	N1CC	CT	A *	104646	461	107
4	W6JTI	CA	A	95462	378	118
5	WDØGVY	IA	A *	73656	317	108
6	WA4TWB	WI	A *	52640	260	84
7	WC4E	FL	A *	48425	350	65
8	W7KZK	MT	A *	40756	206	92
9	N3EYD	PA	A *	38048	317	58
10	K5NW	TX	A *	35535	239	69
11	W6UQF	CA	A	26862	172	74
12	NV7R	MT	A	26202	196	66
13	KB1VL	MA	A *	22933	149	71
14	KE7QA	UT	A *	16650	156	50
15	WBØYJT	KS	A *	15960	132	56
16	W3ARK	PA	A	11169	100	51
17	NGØJ	MN	A *	10914	150	34
18	KO4J	FL	A	9245	100	43
19	KA9IMX	IL	A *	9048	107	39
20	N5IJI	OK	A *	8436	106	37
21	WA1JVV	VT	A *	7826	83	43
22	NØHJZ	MN	A	6480	83	36
23	KP4CZ	CN	A *	5705	78	35
24	KA1LMR	NH	A *	5476	69	37
25	W3SOH	VT	A	3780	46	35
26	W2DW	NY	A *	3658	54	31
27	WK4F	FL	A	3162	45	31
28	KA5KCI	AR	A *	2912	50	26
29	KJ4XM	TN	A *	2727	45	27
30	N8CQA	MI	A *	2668	40	29
31	N2DUB	NJ	A *	2646	62	21
32	NØFFZ	CO	A *	2128	33	28
33	K9LJN	IL	A	1911	42	21
34	KA9FUG	IL	A	1748	32	23
35	N2FBV	NY	A	1725	31	25
36	N2FZJ	NY	A	1587	31	23
37	N5EYT	MD	A *	1536	29	24
38	K8CV	MI	A	1173	29	17
39	KAØJKE	AZ	A *	1008	24	18
40	W9UIX/4	GA	A *	900	23	18
41	AL7CQ	AK	A *	403	15	13
42	N1EAF	NH	A	319	14	11
43	KW2J	NY	A	308	13	11
44	W8YGR	OH	A *	252	12	7
45	W5NR	TX	A	252	11	9
46	W1UDB	NH	A	234	11	9
47	WA2LBT	NJ	A	90	7	6

PHONE, AMERICANS, SINGLE OP, SINGLE BAND

1	KE7KF	UT	7 *	49608	452	53
2	NK7L	WA	14 *	34921	366	47
3	AG7M	OR	14 *	27979	273	49
4	WD4FIP	KY	7 *	20582	246	41
5	KJ4WH	FL	14 *	3472	50	31
6	WN3VAW	PA	14 *	940	20	20
7	WL7BEM	AK	14	846	18	18
8	N5JEE	TX	14	520	18	13
9	WA4KDO	KY	14	405	20	9
10	N3CZB	PA	14	352	13	11
11	N7ICC	MT	7	275	11	11
12	K7RJ	UT	1.8 *	140	14	5
13	KØJVZ	CO	14	55	5	5
14	W7LQU	ID	14	39	6	3
15	KB8AC/9	IN	1.8	27	4	3

PHONE, AMERICANS, SINGLE OP, QRP

1	KH6CP/1	CT	Q *	3675	47	35
2	KB4GID	GA	Q *	1296	30	18
3	N6NF	CA	Q *	704	21	16

PHONE, AMERICANS, MULTI OP.

1	KC7V (+ KY7M)	AZ	M	283500	1079	125
2	WA7EGA (+ WB7RBJ, W7TJ, NQ7M, NR7B, KC7MM, KE8DM)	WA	M	209568	918	111
3	N2GFA (+ N2GBO)	NY	M	4470	70	30
4	KEOCI	MO	M	833	21	17

PHONE, CANADIANS, SINGLE OP, ALL BAND

1	VE7QO	BC	A *	159572	661	82
2	VE7DLM	BC	A *	125476	562	76
3	VE1DH	NB	A *	111051	468	81
4	VE6DZ	AT	A *	59228	385	52
5	VE1CBF	NS	A *	50836	253	71
6	VE3AXV	ON	A *	17493	122	49
7	VE7KGW	BC	A	10260	78	45
8	VE3CWE	ON	A	3978	53	26
9	VY1CW	YU	A *	3504	53	24
10	VE7IQ	BC	A	1037	21	17

PHONE, CANADIANS, SINGLE OP, SINGLE BAND

1	VE3OZB	ON	7 *	82194	488	57
2	VO1QU	NL	14 *	15470	154	34
3	VE1AGZ	NS	7 *	6475	89	25
4	VE3MFA	ON	1.8 *	5037	78	23
5	VE1AGE	NS	14	1720	30	20
6	VE7AV	BC	3.5	1062	43	9

PHONE, CANADIANS, SINGLE OP, QRP

1	VE2AEJ/3	ON	Q *	203	11	7

PHONE, CANADIANS, MULTI OP.

1	VE4ALO (+VE4VV)	MB	M	165352	642	88
2	VE6JO (+ XYL)	AT	M	138528	604	78

CW, AMERICANS, SINGLE OP, ALL BAND

1	N6OP	CA	A *	196396	612	148
2	K5NW	TX	A *	177335	568	145
3	KBOG	KS	A *	152592	512	136
4	K9LJN	IL	A *	120516	422	132
5	KI3V/7	NV	A *	110400	429	120
6	W6UQF	CA	A *	82476	326	116
7	NA9J	IL	A *	76120	316	110
8	KA1LZR	CT	A *	72039	294	111
9	WC4E	FL	A *	58380	254	105
10	N1CC	CT	A	45479	240	89
11	WA1JVV	VT	A *	41310	226	85
12	KA1T	MA	A *	41118	211	89
13	AG7M	OR	A *	38976	217	84
14	KW2J	NY	A *	34510	188	85
15	W2DW	NY	A	25560	164	71
16	W3ARK	PA	A *	19175	134	65
17	KA4JMZ	KY	A *	16695	117	63
18	W4YE	VA	A *	16554	122	62
19	WB1CNM	MA	A	15960	131	56
20	NØFFZ	CO	A *	14927	111	59
21	W3SOH	VT	A	13695	112	55
22	K7EW	OR	A *	11718	105	54
23	WBØYJT	KS	A *	11067	97	51
24	NV7R	MT	A *	10759	96	53
25	WA7RCT	UT	A *	10600	92	50
26	WA2LBT	NJ	A *	10152	87	54
27	N5IJI	OK	A *	9880	85	52
28	WA8YTM	WV	A *	8385	92	43
29	N7IBG	MT	A	7392	83	42
30	AL7CQ	AK	A *	6685	85	35
31	N2FZJ	NY	A	5328	68	36
32	W5NR	TX	A	4448	61	32
33	KV6H	CA	A	4256	63	32
34	N2FBV	NY	A	4247	63	31
35	KA1LMR	NH	A *	3240	50	30
36	W2WOE/9	WI	A *	2944	60	23
37	KL7UR	AK	A	2163	47	21
38	WA2ASQ	NJ	A	2158	38	26
39	W8YGR	OH	A *	1092	26	14

CW, AMERICANS, SINGLE OP, SINGLE BAND

1	W5ASP	TX	14 *	29050	267	50
2	NM2L	NY	7 *	16023	157	49
3	WS4E	FL	7 *	12810	140	42
4	NØFMR	KS	7 *	4031	64	29
5	KJ4WH	FL	14 *	1780	38	20
6	K2SX	NY	3.5 *	1659	36	21
7	N3CZB	PA	14	728	23	14
8	KAØKKV	MO	14	224	11	8
9	K7RJ	UT	1.8 *	156	13	6
10	W4KM	MD	14	84	7	6
11	W3UIU	PA	7	75	6	5
12	KB8AC/9	IN	1.8	12	4	1

CW, AMERICANS, SINGLE OP, QRP

1	KH6CP/1	CT	Q *	20410	144	65
2	KB4GID	GA	Q *	17940	129	65
3	N6NF	CA	Q *	16640	119	64
4	N8CQA	MI	Q *	10240	102	64
5	K5DP	OK	Q	5434	64	38
6	W2JEK	NJ	Q	4588	56	37
7	KN1H	NH	Q	602	21	14

CW, AMERICANS, MULTI OP

1	KC7V	AZ	M	206400	636	150
2	WA7EGA	WA	M	148626	503	138

CW, CANADIANS, SINGLE OP, ALL BAND

1	VE7QO	BC	A *	121220	378	110
2	VE3KP	ON	A *	119040	344	120
3	VE1DH	NB	A *	93896	338	97
4	VO1QU	NL	A *	77352	307	88
5	VE3KK	ON	A *	47690	177	95
6	VE3AXV	ON	A *	43836	200	78
7	VE6DZ	AT	A *	30195	172	61
8	VE3CWE	ON	A	21573	160	47
9	VE2RO	PQ	A *	19198	115	58
10	VE2HN	PQ	A	12691	90	49
11	VE3DJ/1	NS	A *	10320	76	48
12	VE5AGM	SK	A *	5780	59	34
13	VE1BSD	NS	A	5425	54	35
14	VE7IQ	BC	A	3696	45	28

CW, CANADIANS, SINGLE OP, SINGLE BAND

1	KA9LXP/VO1	NL	7 *	6090	73	29
2	VE3OEQ	ON	7 *	4416	48	32
3	VE3MFA	ON	1.8 *	1656	33	18

CW, CANADIANS, SINGLE OP, QRP

1	VE3OOL	ON	Q *	12428	85	52
2	VE7EKS	BC	Q *	360	14	9
3	VE2AEJ/3	ON	Q *	120	9	5

CW, CANADIANS, MULTI OP.

1	VE4ALO	MB	M	170053	467	127
2	VE6JO	AT	M	96209	370	89

CHECK LOGS: AE7K, K1UCA

PETER I ISLAND:

BIRTH OF A NEW COUNTRY

Kirsty Jenkins - Smith, VK9NL

Once it became noticed that Peter I island was to be born onto the amateur bands in late January, expectations ran high. KD7P had tried to bring this new one on a few weeks earlier, but was forced to abandon the project due to heavy ice. But now, later in the Antarctic summer, there might be a better chance.

Einar, LA1EE and Kaare, LA2GV were to be responsible, setting out across the Southern Ocean from New Zealand around the middle of the month. DXers around the world chipped in with money and equipment. The Norwegian government had allowed two amateur radio operators to accompany their mapping expedition to Peter I, and everything was coming together nicely. My OM Jim, VK9JS, became involved through H.I.DX.A. Broken sleep became part of the pattern. The Earth being flat, caused many a phone call from foreign lands in the dead of night.

Yours truly is in attendance on the Maritime Mobile frequency every evening to monitor the last few days in waiting.

The "Aurora" carrying Einar and Kaare is making good time. Smooth seas, not much ice, everything working according to plan. The vessel, a former sealing ship, belongs to the Norwegian Monica Christensen who is at present skiing towards the South Pole. Monica is the first woman ever to undertake such a trip. She is following in Roald Amundsen's footsteps of 1912, to mark the 75th anniversary of the first man to reach the South Pole. Monica has reported unusually warm weather. +6 C is to hot for the Greenland huskies, making progress possible only at night. If that sort of temperature also reigns at Peter I, chances are there won't be too much ice around, making a landing a definite possibility.

The LA boys are out on MM frequency as arrival draws near. They call it from all over the country with good wishes for the expedition. Sked-time on board moves later and later into the night as the vessel steams east. Daily position reports indicate top speed of 10 knots. But even when sked-time is at 2 a.m. shipboard time, Einar never misses a sked. Tension mounts as the "Aurora" crosses the Antarctic circle. One more day, perhaps two, to go. Einar describes icebergs. The sea is like a mirror. A whale has been spotted close to the ship.

Others have joined the LA boys on the MM frequency. There are short bursts of quick speech in Norwegian; monosyllables, references to something only those "in the know" know about, followed by long silences. James Bond type of stuff. Non-Norwegians became impatient, demanding translations. The LA chaps have maintained that there will be no preferences given to any nationality or group. Are they going to stick to it?

Thursday evening Einar announces that the vessel is just now entering Norvegia Bay on the west side if the Island. They can see bits of ice, covered by a thin layer of snow, floating in the sea.The "Aurora" carries a small helicopter which has to be assembled for a reconnaissance flight before landing is attempted. Preparing for the birth is therefore expected to take a couple of days.

But, already from the following evening there is no reply from the vessel, indicating the may be ashore. While umpteen people wait and call on the frequency, word is received by telephone in LA-land that four persons, including Einar and Kaare, are in fact ashore Peter I Island. The birth is imminent.

Although we knew that there will be a lot to do ashore to secure the camp and unload the vessel, Jim and I stay in the shack throughout the evening "just in case." Like expectant fathers we trot around the waiting room listing for the first feeble cries of life.

At about 1200Z on 23rd of January we catch the first signs, the twittering of CW 14022. Jim and I look at each other. It must be a false alarm. However, work him first and worry later. He comes back on the first call, 3Y1EE. Most likely it is a changeling - a pirate. Tomorrow will show. As a matter of fact it was to good to be true.

No further activity is perceived during the next day which is Saturday, allowing work and boring stuff like that to be dispensed with. But, while Jim is running the 220 net, 3Y appears again on CW. The net is abandoned while we settled down to deciding whether this one is the real McCoy. While I am peeling potatoes, Jim works him. By the time I get to try, the pile-up has increased. I call and call. He is listening from 9 kHz above his transmit frequency. How far up? "It's a lucky-dip", I grumble. "Watch the spuds so they don't over cook!" Then all of a sudden he comes back to me. Not only that. He actually passes some info about generator trouble and the fact that they were on the previous evening and that Jim and I are safely in the log. So it was the real thing after all, and the LAs had stuck to their word. It made me feel proud of the newborn.

However, now that he is real, we would dearly like to hear him talk. We hear say that the newborn has a minor defect. His ears are said to be uncommonly large, so that he can listen over 100 kHz. We don't believe this. Hoping that it is just a rumor, we wait. Late in the evening we have a phone call from Japan warning us that 3Y will be on SSB in five minutes. And, there he is.

In fact the newborn is not only already talking but he is out playing ball. There he is, on 14.145 throwing the ball over to 14.280. Someone who happens along throws it back as hundreds of players rush to 14.280 only to find that the ball now lands at 14.300. All players rush frantically for 14.300 when the ball goes to 14.260. With six different possible landing spots, the players are running around wildly, hither and thither. We listen, amazed. As luck will have it, we hear him mentioning that the next ball will go in 14.115, behind him. As quick as the fingers can turn the dial, we are there and bag him.

Listening to 3Y at the time of writing, the ball game is in full progress. It is not an easy game, and those who are tied down without a VFO won't be able to work this new one. It is a new game in DXing, and luckily hardly anyone else plays like that. Eric, SMOAGD played like that some years ago, listening in those frequencies. Apart from occupying too much of the band for one single DX station, this sort of operating can only classify the DX station as "hard to work." (The best and fairest "ball" to play in a case of rare expedition. Ed.)

Besides this, I am pleased to hear that the new one is conscientious, even if playful. There is no sloppy operating. Each call is acknowledged in full. There have been far too many operators over the past few years who have resorted to only going back to a couple of letters of a call, saying "QSL, you're 5-9" leaving everyone wondering who in fact he worked, and opening the way to hundreds of QSL cards from guys not in the log.

3Y is also considerate. While most expeditions usually announce "only JAs" or "only Europe," "North America" or, even on rare occasions "Africa," this one has been known to ask for VKs and ZLs, the usually forgotten countries in DXpeditioning circles.

Congratulations to the LAs on the birth of the new one!

(VK9NL)

THE WAVE ANTENNA

Bob Eldridge, VE7BS

Many long low pieces of wire are called "Beverages" when they aren't, just as many long pieces of wire are called "longwire antennas" when they aren't. I came across a description in the file, annotated just "John Hines, Ohio State," which seems to me to be very clear.

"This type of antenna is a long transmission line. In its very simplest form it is a straight horizontal wire a few feet above grade level, the length being anywhere from one to several wavelengths. The characteristic impedance of this wire unbalanced to ground is roughly calculable by using the image in the ground as the second conductor in a parallel-wire system. The receiver is coupled in at one end of the line (through a matching transformer), and the other end is terminated in a resistance equal to the characteristic impedance. Stable ground systems are necessary at both ends.

The long open-wire transmission line pointed in the direction of a passing wave has a high degree of exposure to the horizontal component of the wave front because of the wave tilt that earth losses produce in vertically polarized low-frequency waves travelling along the surface of the earth. This induces in the line a series of emfs that are propagated along the wire in the form of a travelling wave which starts at the distant end and is propagated towards the receiver. The entire wire receives energy from the passing wave so the effects are cumulative at the receiver.

Energy collected from a passing wave travelling in the opposite direction is completely dissipated in the terminating resistor and so does not enter the receiver. Waves arriving from the side have relatively little effect on the receiver. Hence the antenna has high directivity in the horizontal plane.

One version has the receiver coupled to the end of the antenna closest to the direction from which the signals are coming. A two-wire line is used. Waves arriving from the preferred direction act upon the two wires in parallel to ground, and the induced wave of energy in the wire travels to the distant end where it encounters a reactive network called a reflection transformer. This device reverses the phase in one of the wires and reflects the energy back to the receiver, the reflected wave now travelling in the two wires balanced to ground. A similar effect can be obtained by grounding one wire and leaving the other open-circuited. The receiver coupling network terminates the line and absorbs all the energy in actuating the receiver. A wave entering the system from the reverse direction travels along the wires in parallel against ground, producing no potential difference across the balanced termination, and therefore has no influence on the receiver. Instead, the circuit to ground is terminated in the characteristic impedance of the parallel-grounded system, and the unwanted wave is completely dissipated in a resistor.

This antenna is suitable only for reception, since for transmitting the ground losses are relatively high compared with the radiated energy." (End of the quote from John Hines).

For amateur purposes it would be too sharply directional if longer than one or at the most two wavelengths, and in any case the gain would be reduced because the signal on the wire begins to get out of phase with itself.

You can draw some fundamental principles from Hines' description. The wire must be straight. It must be correctly terminated. It must be matched to the receiver or preamp (and matching it may make the preamp unnecessary). If it is too high (more than 6 or 7 feet for 160 meters) it may not work properly. The articles in QST Jan 1982 (Beverage and DeMaw) and June 1977 (Barry Boothe) are mines of practical information.

Here are some extracts from the abstract of the paper presented at the Midwinter Convention of A.I.E.E., Feb 14-17 1923, by Beverage, Rice and Kellogg. Some of these fundamentals seem to be overlooked or forgotten now, so bear repeating. The paper deals primarily with the two-wire Beverage, but mentions that this is not an essential feature except that it permits flexibility in the location of the receiving station.

"Comparative immunity of the receiver to disturbances coming from a direction opposite to the desired signal is lost if reflection is permitted to occur at the end farthest from the receiver. The growth of current in the direction of travel of the space wave depends on the velocity of propagation of waves on the antenna in comparison with the velocity of the space waves, the received current being strongest if the two are equal. If the characteristic wave velocity on the antenna is less than that of the space waves (or less than the velocity of light) increasing the length of the antenna increases the received current up to a certain point, after which further increase in length REDUCES the received current. The length for maximum signal depends on the velocity ratio and the wavelength; the slower the antenna or the shorter the wavelength received, the shorter the antenna for maximum signal. It is very frequently the case, however, that the best directive properties are obtained with an antenna longer than that which gives the strongest signal.

The space wave produces in the wire a signal frequency emf which affects the different parts of the antenna progressively as the space wave passes over the line. On this basis the received current can be calculated in terms of the frequency and the intensity of the induced emf, the direction of the space waves and the length and electrical constants of the antenna. By assuming the direction to be changed while all other factors remain the same, and calculating the relative value of received current for various directions of signal wave, we can determine the directive properties of the antenna.

In general, it is found that moderate line losses are not appreciably detrimental to the directive properties of the antennas, while the fact that velocities obtainable with unloaded lines are materially below that of light, results in an actual improvement in directive properties in most cases. As a rule, the longer the antenna the sharper its directive curve. While it is possible to obtain fair directivity with antennas less than a half wavelength long, this length is considered about the shortest that can be recommended. By a process of balancing, it is possible to produce a blind sport (direction of zero reception) at any angle more than 90 deg. from the signal. One method of obtaining this result is by producing reflections of certain phase and intensity at the end opposite to the receiver.

Reflections at the receiver end...DO NOT alter the directive properties.

Measurements...show much higher attenuation and lower velocities for ground return circuits than for metallic circuits, because of ground resistance. The mean depth of return currents at the longer radio wavelengths appear to be of the order of several hundred feet (this was for 12,000 meters). THE MORE WIRES IN MULTIPLE IN THE ANTENNA, THE LOWER THE VELOCITY AND THE HIGHER THE RATE OF ATTENUATION."

Beverage first used rubber covered wire, laid on sand and scrub. The wire was too long, and by listening at different points along it, it was established that the signal on the wire was lagging behind that in free space. Working with Rice he checked the characteristics of the insulated wire. They measured the input current to the line as the frequency of an oscillator was varied. With the far end open there is a current maximum at the oscillator when the line is electrically an odd number of quarter-waves long; with the far end grounded the maximum occurs when the line is electrically an even number of quarter-waves long. Comparison of the physical and electrical length reveals the velocity factor.

They also supplied the line with a constant current and measured at various places along it with a hotwire ammeter - this revealed both the velocity factor and the attenuation. Inserting series capacitors (.1 mF) at intervals improved the velocity factor, but the attenuation was still too high, so a test antenna was built using bare #10 copper wire on insulators at 18 and 30 feet above the ground (the experiments were at 7000 to 15000 meters remember). The velocity factor was close to 100%, the attenuation was now very slight; but reflections with the far end grounded were nothing like as good as with the far end open. This was corrected by replacing the iron wire radials with copper wire, and this also made possible a stable terminating resistance when standing waves on the wire were not desired.

The action of the Beverage antenna is well explained in many textbooks, so I am not going through it yet again, but there is an appealing part of the paper which highlights the attitude of early experimenters!

I quote: "An interesting experiment is to run over thin ice. If you run at just the speed of wave propagation of the ice surface you can build up a larger wave. If you run too slow or too fast little effect is produced." I guess if you run at exactly the right speed you don't get to repeat the experiment! Rice and Kellogg built an ingenious mechanical model to illustrate the resonance effects of the inductive and capacitive characteristics of the line, and the in-sync arrival of signal impulses on the line, and damping with a dash-pot.

Kellogg suggested the use of a "reflection transformer" at the far end of a two-wire Beverage (as shown in Fig. 5 page 13 of QST January 1982), to make it possible for the terminating resistor to be placed at the receiver end. "When the primary of the "reflection transformer" was opened the receiving set was quiet, showing that the transmission line although not transposed, was not introducing any undesirable emf. Thus a horizontal loop receives neither static nor signal." (This means a very long and very narrow loop of course). It was later found that leaving one far end wire open and the other one grounded works just as well as a "reflection transformer" and is much easier to arrange.

With the damping resistor now more easily accessible, Beverage showed that even better front-to-back ratio could be achieved by taking a small amount of the signal flowing through the damping resistor, adjusting its phase and intensity and combining it with the signal received from the antenna. Thus the balancing network was born.

Using bare copper wire for the antenna, and an antenna longer than that which gave maximum signal amplitude, the upper limit to the signal amplitude is set by the velocity factor or the line losses. Assuming zero losses and 100% velocity factor, curves were developed to show the directive pattern of antennas halfwave, fullwave and two waves long. At the -6dB points the forward lobes were respectively about 105, 100 and 60 degrees wide. Although there is very little difference in the forward pattern of the half and full wave models, the halfwave has a significant minor lobe directly to the rear, whereas the fullwave has a null there. A fullwave antenna artificially "speeded up" with series capacitors has a forward lobe about 100 degrees wide for constant gain, and is down 6 dB at about +70 and -70 degrees. Pickup from the rear can be eliminated by careful adjustment of a phasing network (inductor, capacitor and resistor in series, as used in W1WCR's steerable antenna design); there are many pages of calculations and discussion of the values necessary for phasing adjustment.

Calculations showed that using phasing networks to balance out pickup from the rear, an antenna a quarter or even an eighth wave long can have a directive pattern about equivalent to an uncompensated fullwave model. But the signal intensity is so much reduced that noise picked up by coupling transformers and incidental vertical elements (connection to ground for example) becomes excessive; it was concluded that a fullwave is about the optimum, and a halfwave about the minimum practical length.

There was a great deal of interest in the theory of the wave antenna. Was the collection of energy from space dependent upon wave front tilt, or upon the height of the wire above the earth and the consequent space potential? Experiments with a half wave antenna running at right angles to the direction of arrival of the signal from a broadcasting station showed that the operation of the wave antenna is dependent upon wave front tilt. This was confirmed by further tests which showed that using very long antennas the signal pickup was independent of the height of the wires above the ground. Because of the dependence on wave front tilt, the Beverage works better over poor (non-conductive) ground.

Using a calibrated generator at the input of the receivers, it was found that with an antenna 14.5 km long, the signal produced at the input to the receiver was 80 <millivolts> from Nauen (Germany) and 54 millivolts from Carnarvon (Wales), corresponding to 9 and 4 microwatts received at the antenna.

There are many pages describing the methods of measuring the essential constants of a wave antenna (wave velocity, attenuation constant and surge impedance). The most important measurement, determination of the surge impedance, is described on page 15 of the January 1982 QST.

A lot of work was done in the early 1900's trying to determine just where the atmospheric QRN originated. Some tests done with directive antennas resulted in the following conclusions:

U.S. N./Atlantic Coast - mainly S-W
Gulf Coast - roughly S-W
Seattle - roughly East
San Francisco - sharply East
Puerto Rico - West and South

Directive antennas are the best weapons against static, and the best signal-to-noise ratio is often achieved by creating a null in the direction from which the noise comes rather than aiming the "gain" lobe at the desired signal.

CONSTRUCTION OF A BEVERAGE ANTENNA

There is no point in putting the wire higher than is necessary to clear obstructions and people. The wire should

be straight and preferably bare, and on good insulators. For two-wire models, thin wires relatively close together give higher velocity and lower loss than thicker wires further apart - in each case maintain good balance to ground.

For an antenna one wavelength long, best directive properties are obtained with a velocity factor (vf) of 70-80%; higher vf is better for longer antennas and lower vf for shorter.

The site should be as flat and uniform as possible. Avoid being parallel to other wires. For a reversible antenna, grounding one far end and leaving the other unterminated is much easier to play with than are reflection transformers. (Not mentioned are - keep vertical elements short; if you use radials to ground the far end, use lots of short ones rather than a few long ones, and don't have long ones at right angles to the direction of the antenna wire).

In discussing the application of the wave antenna to amateur frequencies, it is suggested in the paper that it is desirable to have a series-tuned circuit in series with the terminating resistor (the reactance of each at the operating frequency being not more than about 500 ohms). The transformer coupling the antenna to the receiving system should also match the surge impedance of the antenna of course.

That concludes the summary of "The Wave Antenna," presented by Beverage, Rice and Kellogg at the AIEE Midwinter Convention in New York in February 1923.

A NOTE ON THE TWO-WIRE BEVERAGE

When you are using two wires, one grounded at the far end and the other one unterminated, don't forget that the "terminating resistors" are now the primaries of the matching transformers.

If the match to the receiver is not correct, the transformer will reflect some of the signal back into the antenna and set up a standing wave. If everything else were perfect, anti-phasing at the far end would cancel it out again, but any unbalance will cause the anti-phasing to be less than complete and will harm the rejection of signal from the rear.

If you "ground" the far end of a wire by extending it by a quarter wavelength (on the assumption that a quarter wavelength of wire open at the far end looks like a very low impedance at the point where it joins the antenna wire) give some thought to the way it operates.

Consider an induced signal travelling along the pair of wires towards the far end. When the signal reaches the end of the normal-length wire, it is reflected at the open termination and starts back towards the receiver. On the longer wire it carries on for a quarter wavelength, is reflected at the open end, and arrives back at point A having been delayed by HALF a wavelength, and therefore out of phase with the reflected signal in the shorter wire. This is the same condition that would have been produced by a good ground at point A on one of the wires.

When the signal is coming from off the far end of the antenna, the quarter wave extension is part of the antenna and will pick up some signal. If the extension runs straight out from the end, the directivity will be unaffected. But if it runs in any other direction it will pick up some signal from that direction, and also a small amount of out-of-phase desired signal.

And what if you fold the extension back on the antenna? Well, the signal from the far end direction starts along the extension, hits the open termination, reverses direction, and....YOU play with what EA3VY calls my "famous arrows"!

(Most of this article first appeared in the West Coast 160 Meters Bulletin). (VE7BS)

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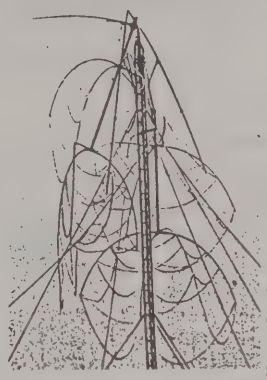

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Mary Ann Crider, WA3HUP (L) and Riki Klein, 4X4NJ finally met at Dayton and have a lot to tell. Mary Ann has supplied thousands of QSL cards to many deserving DXers, she is a QSL manager for many rare DX stations. Riki has 160 m DXCC and is a frequent winner of many 160 m contests.

ANTENNAS FOR 80/160 m

John Devoldere, ON4UN

PHASED VERTICAL ARRAYS

Last month I promised I would come back on the subject of vertical arrays and explain what makes them work or not. W1FV wrote a good introductory article (RADIOSPORTING, Jan 87, pg 21. etc) on this subject. The problem areas are highlighted very correctly and two design solutions are mentioned (K2BT and W7EL). Two more approaches are known to me, the W1CF and the KB8I method. The four feed/phasing systems can all work fine, but each have advantages and drawbacks.

K2BT has the enormous merit of being the first to describe in a series of articles the real problems in designing and building a phased array, and he proposes a design solution which works perfectly well, but may not be the easiest way to solve the problem for the average ham. It requires rather profound knowledge of the theory, and a good deal of impedance measuring and network designing, measuring and aligning is required. It is certainly not the solution for the "appliance type operator."

The KB8I approach, makes use of the transformation of impedances along feedlines with non-unity SWR to achieve proper phasing and current feed to the antennas. It is a very clever way to do things and is most suitable for two element arrays (90 degrees or 135 degrees phase shift) as it requires no networks (L's and C's) as in the K2BT design. Using a software program which is part of the LOW BAND DX-ING software package, the KB8I feed system can be designed in minutes.

Both the W1CF and the W7EL feed systems make use of a very particular property of quarter wave feedlines. Let me explain with an example. If you feed an element of an array which has an impedance of 23-j12 ohm and which requires a feed current of 1 Amp at 0 degrees, then the voltage at the end of the quarter wave 50 Ohm feedline will be 50 V (at a phase angle of -90 degrees), independent of the impedance of the antenna (load). This means that for arrays requiring element feed currents of the same magnitudes (e.g. 1 Amp) the voltages at the end of 50 Ohm quarter wave feedlines will all be 50 Volts in magnitude with a phase angle that lags the element feed current angle by 90 degrees. All this is true totally independent of the impedance of the array elements. This makes it much more easy to design a system to correctly feed the array elements. W1CF and W7EL followed different routes.

W7EL uses LC networks to achieve the required phase difference and current magnitude. These networks are frequency sensitive and the total system is relatively narrow-banded, as is the case with the K2BT and the KB8I solutions. Typically one would need 2 networks to cover the CW and the Phone section of the 80 meter band. There is no published information (that I am aware of) on the design criteria for the W7EL networks, but I have worked out the criteria to do so, by using some quite simple network design programs which make part of the above mentioned software package available through RADIOSPORTING (see relevant ads).

The total network consists of a maximum of 4 discrete components (L's and/or C's). However in order to correctly design these networks one has to know the impedance of the elements of the array (in the array configuration, taking into account mutual impedances). How does one know what these are? Can they be measured with an Ohmmeter? It's not quite that simple. It requires iterative measurements of the different element in a coupled and an uncoupled environment. From these series of measurements and given the element currents (magnitude and angle) one can then compute the feed point impedances of the elements. It requires complex mathematics, but can be done in minutes using one of the programs from the software package LOW BAND DX-ING, which were developed specially for this purpose. If the software has made the calculations easy, it still requires some accurate measurement tools, and the cheap noise bridges will not do the job. A quality RX bridge of a well designed noise bridge is essential.

W1CF went one step further. He also used the specific properties of the quarter wave feedlines, but then feeds these feedlines from a HYBRID QUADRATURE COUPLER. This coupler is a broadband device which supplies equal magnitude output voltages with 90 degrees phase shift over a relatively wide frequency range (easily the entire 80 meter band) and with loads representing non-unity SWR's. The coupler represents a non-conjugate match to the feedlines, and reflected power is dissipated in a (3rd port) terminating resistor. This unique solution has the tremendous benefit of being applicable to a variety of arrays. The only limitation is that all the array elements have to be fed in quadrature, which means that the element feed currents have to be a multiple of 90 degrees. Most of the common arrays are quadrature fed (e.g. two element end fire 1/4 wave spaced cardioid array, with the elements fed 90 degrees out of phase, three element triangle array, 4 element bi-square array with 1/4 wave spacing etc). The coupler can be used for arrays using quarter wave or half wave vertical elements, dipoles, delta loops etc. In order to optimize the efficiency of the coupler (which means to reduce the power loss in the third port termination resistance) one can optimize the design impedance of the coupler proper.

All 4 practical feed systems for driven arrays are covered in great detail with many design examples in my new book. All popular array configurations are covered. If you are not a dedicated designer, builder with some engineering abilities, then W1CF system is for you. The hybrid coupler and the direction switching harness as well as complete array systems are available from COLATCHCO (joint venture W1CF and W1FC), Box 230, Carlisle Mass 01741.

I can guarantee you that some of the better signals from the US on the low bands come from properly designed arrays. While the arrays designed with phasing line lengths equal to the required delays may have yielded some usable gain, they certainly hardly ever showed good F/B ratio. Arrays with a proper feed system (one of the 4 above) will show up to 30 or 35 dB, which is very impressive. In addition, such systems have the distinct advantage of allowing instantaneous direction switching, which is not the case with rotary systems.

This brings me to the point of what are the pro's and cons of vertical arrays (e.g. the popular diamond square array) versus rotatable yagis (the so popular KLM's or the newer Create design beams). Vertical antennas and arrays made of vertical elements require a good ground. For two reasons: for efficiently collecting the return currents (determines the efficiency of the antenna or array), and

for obtaining a good low angle of radiation. Excellent reflecting grounds extending several wavelengths (up to 100 according to some sources) can lower the radiation angle by as much as 10 degrees. That is why verticals can work so extremely well close to the sea. Another requirement for verticals and vertical arrays to work efficiently is to have the proper topology around the antenna. What we want is essentially flat terrain with very few obstacles around.

Horizontally polarized antennas, to the contrary, do not require good ground conductivity. (This may be more true with very high antennas. The ground reflections and good ground are still part of the horizontal antenna's performance, plus the quality of ground out to many wavelengths enhances the signals. VE3BMV) The only thing they require is height. Effective antenna height can often be achieved in circumstances where good ground conductivity is out: in mountainous areas.

Rotary horizontal antennas however have the disadvantage of being directional. Does that make sense? Sure. There are a couple of reasons for this statement being correct: Very often the signals do not propagate in the great circle direction. Some recent examples are covered in the propagation sections of my column. So you have to know the propagation path or you might be shooting in the wrong direction altogether. Also you might want to be in a round-table DX-QSO where you need your signal to be radiated equally well in more than one direction. This is where either the vertical all driven arrays with there ability of instantaneous direction switching or the combination of an efficient omni directional antenna complimented with an array of Beverages is hard to beat.

On 80 meters it is possible to erect horizontally polarized antennas producing acceptable low angle radiation. All you need is at least 100 ft of height, preferably 150 ft. On 160 meters it becomes almost impossible to reach the minimum height of 200 ft. Paul, VS6DO has his 160 meter dipole hanging from a 55 ft mast on top of an 8 store building, which ends up close to 200 ft total height. And that can help in producing a very respectable signal.

SELECTION OF VERTICALS

A "full-size" quarter wave vertical with a good ground system would certainly be the dream of all top band DXers. Depending on the ground conductivity this antenna will produce an angle of radiation of 20 to 30 degrees, which is very adequate for DX-work on 160. The radiation resistance being 36 Ohm, and assuming we have a reasonable ground system (for collecting return currents) with an equivalent loss resistance of 10 ohm, the feed point impedance will be 46 ohm (at resonance), yielding an almost perfect 1.1:1 SWR and an efficiency of 78 % (equivalent loss 1 dB). Let us use these figures to compare "less ideal" vertical antennas. Let us examine how well vertical of lengths carrying between 0.18 wavelength (approx 88 ft) and 0.07 (36 ft) wavelength long can perform on top band.

In principle we can load these short verticals in different ways: base coil loading, coil loading along the vertical (e.g. at half height), top capacity loading, linear loading plus of course any combination of the before mentioned methods. For all calculations we assume a 10 ohm equivalent ground loss resistance (which is achieved e.g. by installing 30 radials of 0.35 wavelength, or 60 radials of 0.2 wavelength, or 150 radials of 0.15 wavelength long over a good rich wet ground).

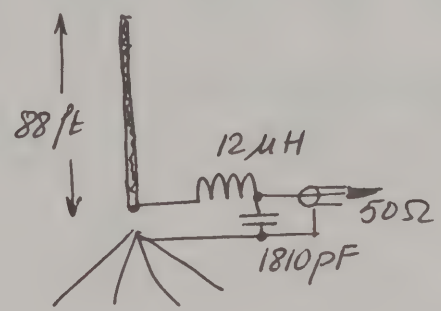
Inputs are: design frequency 1.83 MHz, loading coil Q-factor: 300, tower size (diameter): 10 inch.
The last column gives the loss expressed in dB versus a perfect situation (to compare with our reference 1/4 wave vertical, subtract 1.0 dB).

BASE COIL LOADING.

height	radiation resistance	loading coil	feedpoint impedance	efficiency in %	equiv. -dB
36 ft	1.9 ohm	30 µH	13.5 ohm	14 %	8.0
45 ft	3.0	25	14	23	6.5
66 ft	7.0	16	18	40	4.0
88 ft	13.0	10	24	57	2.4

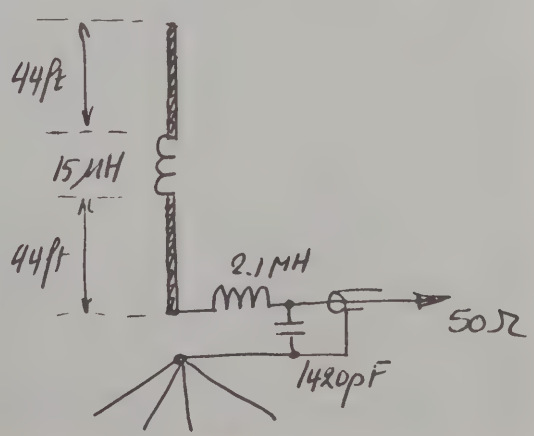
In all cases the vertical must be matched to a 50 ohm feedline via an L-network. The values of such an L-network are shown below. The coil is in series with the loading coil of the radiator, the capacitor across the 50 ohm coaxial feedline. It is obvious that the 2 coils can be combined to make one coil. Just add the values of the loading coil and the coil of the L-network as shown below.

Vertical type	Z-in ohm	Z-out ohm	Series coil µH	Parallel C pF	Combined coil value (µH)
36 ft	50	13.5	1.90	2860	32
45 ft	50	14	1.95	2790	27
66 ft	50	18	2.10	2320	18
88 ft	50	24	2.20	1810	12



COIL LOADING HALF-WAY UP THE VERTICAL.

length	radiation resistance	loading coil	feedpoint impedance	efficiency in %	equiv. -dB
36 ft	3.3 ohm	45 µH	15 ohm	21 %	6.7
45 ft	5.3	34	17	31	4.8
66 ft	10.9	23	22	49	3.1
88 ft	18.7	15	30	63	2.0



L MATCHING NETWORK TO 50 OHM LINE:

Vertical type	Z-in ohm	Z-out ohm	Series L µH	Parallel C pF	Combined coil value (µH)
36 ft	50	15	2.0	2556	47
45 ft	50	17	2.1	2423	36
66 ft	50	22	2.2	1960	25
88 ft	50	30	2.1	1420	17

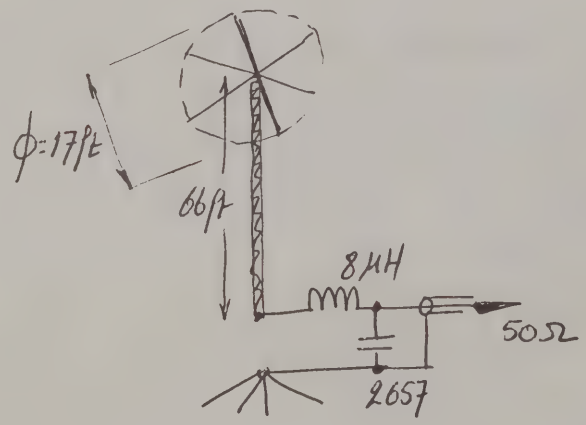
CAPACITY TOP HAT LOADING.

Here we assume that we can make a capacity hat with a physical dimension of about 17 ft in diameter. The capacity hat can consist of at least four conductors going out from the vertical, like the spokes of a wheel, with the ends connected like a wheel. The remaining required loading is done by bottom loading coil.

length	length of hat	radiation resistance	remaining loading L	feedpoint imped.	eff. in %	equiv -dB
36 ft	200 deg	4.1 ohm	14.5 µH	15 Ohm	28	5.5
45 ft	205	6.5	11.6	17	38	4.1
66 ft	202	14.4	6.2	25	57	2.4
88 ft	205	26.5	1.1	37	72	1.4

L MATCHING NETWORK TO 50 OHM LINE:

Vertical type	Z-in ohm	Z-out ohm	Series L µH	Parallel C pF	Combined coil value (µH)
36 ft	50	15	2.0	2656	17
45 ft	50	17	2.1	2423	14
66 ft	50	25	2.0	2657	8
88 ft	50	37	1.9	1031	3



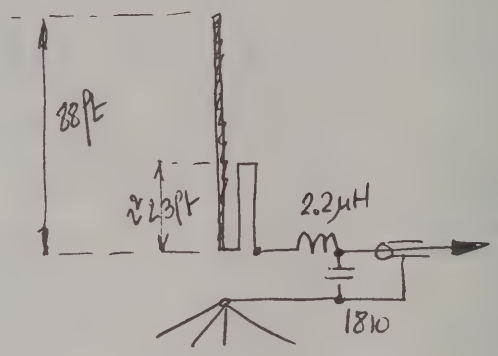
LINEAR LOADING.

Linear loading is used commercially by Hy Gain in their 2 el. 40 meter 402BA yagi and by KLM on their reduced size 40 and 80 meter yagis. Part of the full size element is folded back and forth along the element proper. The folded back portion is called the linear loading section. Its length depends on the position of the section (insertion point) and the diameter and spacing to the element proper. If used at the bottom of the vertical (as shown in the figure) its length is usually 10 to 30 % longer than the "missing" length (v.s. a full quarter wave antenna) it is replacing. Loading coils are always more lossy and more difficult to maintain.

length	radiation resistance	feedpoint impedance	efficiency in %	equiv. -dB
66 ft	8.0 ohm	18 ohm	44 %	3.6
88 ft	14.0	24	58	2.3

L MATCHING NETWORK TO 50 OHM LINE:

Vertical type	Z-in ohm	Z-out ohm	Series coil uH	Parallel Cap pF
66 ft	50	18	2.1 uH	2319 pF
88 ft	50	24	2.2	1810



COMBINED METHODS.

All of the above methods can be combined to achieve the proper resonant frequency. For example: a loading coil is often used above the capacity hat to achieve full resonance. The general rules for obtaining best performance are:

- make the vertical as long a physically possible (we are talking about "short" verticals)
- use as much capacity top loading as possible.
- if bottom loading is required, use linear loading instead of coil loading.
- make the best possible ground system.

The question of bandwidth was not considered, because on 160 bandwidth if often not a limiting factor. In addition the vertical can easily be shifted slightly in resonant frequency by adjusting the values of the components of the matching L-network.

Notice from our exercise that the 66 ft vertical with top loading compares very well with the 88 ft vertical with linear loading.

My 160 meter vertical is 88 ft long, has a 23 ft long linear loading section, has no top loading (I also want to use it on 80), and uses 160 radials, ranging from 50 to 300 ft long. In total about 4 miles of radials are installed. The calculated feedpoint impedance is 14 ohm, while I measured 19 ohm feedpoint impedance, which results in a total efficiency of 73 % (-1.3 dB loss). This compares favorable with the reference 1/4 wave antenna as my ground system

is substantially better (5 ohm vs. 10 ohm).

LOADING TOWERS

Towers supporting beams can be used advantageously as excellent low angle radiators for 160 meters, provided a good ground radial system is used. Matching the tower to a 50 Ohm feedline may seem a difficult task to many, but it should be child's play using the table shown below. The table gives you the equivalent length (in degrees and wavelengths) of your tower having a given physical height and being loaded with a yagi with a given area (Boom length x element length. Not the wind load area! VE3BMV).

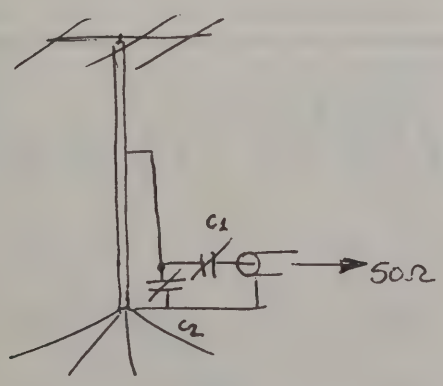
The most flexible matching systems is the OMEGA system comprising two capacitors (the series capacitor and the shunt capacitor). Notice exactly how the shunt capacitor is connected. The values shown in the table below are "ball-park" figures, and should be a good starting point for quickly designing a matching system. One can also use a gamma match but it will require repeated tower climbing to adjust the correct rod length in order to obtain a good match. The antenna area figures I used in the table are representative for a small tribander (425 sq ft), a 3 element 20 meter full size (650 sq ft), a 4 element full size 20 meter (1000 sq ft) and a large 5 el 20 meter yagi (1250 sq ft).

160 METER (1830 MHz)

Tower height	antenna area	equiv. length deg	wavel.	omega rod length	series cap C1 pF
60 ft	425 sq ft	69	0.19	41 ft	400
60	650	75	0.21	35	600
60	1000	83	0.23	33	750
80	425	82	0.23	30	750
80	650	88	0.24	39	720
80	1000	96	0.27	51	550
100	425	95	0.26	50	550
100	650	101	0.28	56	450
100	1000	109	0.30	62	330
100	1250	114	0.32	65	300

Note the electrical length of the antennas: between 69 and 114 degrees which is excellent. The length should be as long as possible, never exceeding 0.62 wavelengths.

The shunt capacitor C2 connected as shown below has a value of 1000 to 1500 pF.



For 80 METERS (design freq. = 3.365 MHz) the values are:

Tower height	antenna area	equiv. length deg	wavel.	omega rod length	series cap C1 pF
50 ft	425	124	0.34	34 ft	140
50	650	136	0.38	36	125
60	425	137	0.38	36	125
60	650	150	0.41	38	105
60	1000	166	0.46	40	97
80	425	164	0.46	40	96
80	650	176	0.49	40	92
80	1000	189	0.52	41	90

The shunt capacitor C2 has a value of 500 to 750 pF.

Adjustment: if no match can be obtained and the shunt capacitor is at minimum value, then the gamma rod is too long or the rod is too far away from the tower. If the shunt capacitor is at maximum value and no match can be found then the feedpoint must be attached higher on the tower or the gamma rod moved further away from the tower.

The gamma rod can be made of a single wire, although it is advisable, if wideband operation is required, to use a large diameter conductor. An aluminum tube or a wire cage consisting of a number of parallel wires in the form of a cage can be used for the purpose. The separation from the tower can be 1-2 ft.

The cables leading to the HF antennas and the motor must be routed inside the tower, and buried under the ground in order to provide sufficient RF decoupling. If there is still too much RF one the cables where entering the shack, one can coil the cables a number of turns (approx 1 ft diameter) or use toroidal cores, Snap-ON-Chokes (see advertisement in this issue), or ferrite rods to provide additional decoupling.

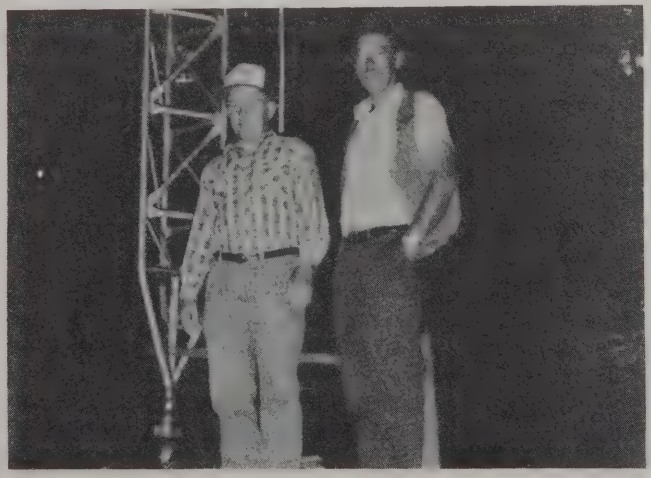
Don't forget the radials. Such a grounded tower vertical needs radials just as well as any other vertical. The more the better. Generally it is better to have a large number of short ones than just a few long ones. Chicken wire laid around the mast in the shape of radials is excellent too.

It is also very important to have good electrical connection between the various sections of the tower. You may have to install straps.

All calculations are done with programs that are part of the LOW BAND DX-ING software which is available through RADIOSPORTING.

Next time we'll have it about Beverage antennas.

(ON4UN)



Jack, VE1ZZ (left) and Ivan, VE3INQ at VE3INQ's 160 m vertical base.

A Question of Peer Pressure

Bill Myers, K1GQ

I have a problem. One of our club members is running illegal power and I want him to stop. I've talked to several other members about how to change this guy's behavior, and the consensus is that I should apply "peer pressure". My problem is that nobody can explain how to do this.

Maybe I should threaten to resign my membership unless the club does something? That's neat – it shifts the burden off me and onto a bigger target, in case the guy gets angry. But, what is the club going to do, threaten to revoke his membership? Probably he would quit the club and carry on as usual, costing the club an active member with no positive effect. Furthermore, exactly who in the club decides what to do? The officers, perhaps, or the meeting attendees, or ...? We have no guidelines, no ethics code, no disciplinary penalties. Remember the ill-fated ARRL ethics code of a few years back? Similar efforts within YCCC have also failed, for similar reasons, I think.

Besides, I don't want to quit YCCC – I get too much out of this club to discard my membership casually. But perhaps I should also be concerend about my own "reputation," which is affected by that of the club in general. We YCCCers perceive ourselves as straight-arrow contesters who carefully get the calls correct, rigorously check our logs, and play by the rules. Our single-ops who chose to use spotting nets while ignoring the ten-minute rule submit their logs in the multi-multi category. Our multi-single entries use only one transmitter. We're the good guys! Sure we are – ask any FRC member. In other words, if I were really worried about my association with YCCC tarnishing my reputation, I should quit right away. (Of course, such worries are silly. The opinions of those who judge individuals solely by the actions of their associates aren't worth cultivating.)

It seems clear to me that "group" peer pressure is not the answer. It's too impersonal, and lacks accepted procedures (and arguments about these procedures derail many disciplinary efforts). But can just one guy (me) apply effective peer pressure? I think not – peer pressure seems implicitly to be plural.

We all understand what's right and what isn't. Sure, there are gray areas, but why is it so hard to simply say: "That's wrong and I wish you wouldn't do it" when a fellow contester tells you he is running 2500 watts output? What are we (me again) afraid of?

Well, for one thing I don't want my complaint dismissed as simply sour grapes. I've been beaten by this guy in some contests. On the other hand, I've also won a few, so the sour grapes issue can't be the only things holding me back.

There are, I believe, two basic reasons why I have not spoken up. First, I am uncomfortable with confrontational scenarios: visions of loud voices, guy wire cutters, and (worst of all) lawyers begin appearing in my imagination. Second, I fear that, instead of accomplishing anything positive, my speaking my mind would only cost me a friend. But keeping quiet doesn't do any good; in fact, it may even reinforce my friend's attitude – if nobody tells him it's wrong, it is easier to convince himself that it's OK. So, I must overcome my fears, and voice my objections.

One last question. Why haven't I named the "guilty party" in this article? Suppose I said: "He knows who he is, maybe this article will be enough to change his behavior." That's just a copout to cover the fears above. How about: "Actually, I suspect there are others and I'm hoping this will stop more than one guy." Still a copout. High-toned, untargeted letters-to-the-editor, like this one, typically have no visible effect (it's always someone else they're talking about). I haven't named him because I'm convinced that peer pressure has to be applied by each of us, individually and personally. I'll try, and I hope some of you will join me.

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PHONY CHAMPION

A. Gusev, UA3AVG

Special USSR "RADIO" Magazine Correspondent
(datelined) Mary - Ashkhabad - Moscow.

(Although the following article concerns a contester in the Soviet Union, so the rules being applied differ in some respects from ours, unfortunately the title PHONY CHAMPION sometimes could be applied to some well-known European and American operators. Thanks to Dex, W4KM, for this translation from the December, 1986 magazine "Radio", published jointly by the Ministry of Communication of the USSR and the military training organization DOSAAF.)

I've often heard from shortwavers that excessive transmitter power and other violations are committed most often by stations placing among the top ten in contests. Of course you can't lump everyone together, but such charges don't seem to be without foundation - all you have to do is listen during a contest to be convinced of their veracity.

Of all technical forms of sport, only the shortwave radio communication championship is waged in off-site battle (i.e., without the contestants being present at the contest site). Naturally it is assumed that the rules are strictly followed. It's not for nothing that shortwave contestants are required to confirm that they haven't violated anything.

Alas, violations and even very serious violations still occur. "Amateurs" willing to achieve victory or receive advanced sport titles without earning them have not disappeared.

The day before an official trip by two employees of the Central Radio Club of the USSR Named after E.T. Krenkel, to Mary (in UH8 - the Turkmenskaya SSR in Soviet Central Asia, some 230 km NNE of where the borders of Afghanistan, Iran and the USSR intersect), there were none of the usual long distance telephone calls asking to be met or to have hotel reservations made. For only a limited number of people knew of the inspection trip, so as not to disturb the "natural" course of events on the spot, 2000 and some-odd kilometers from Moscow.

The plane arrived in Mary Friday evening - a day before the National CW Shortwave Radio Communication Championship. Next morning the inspectors, G. Shchelchkov, chief of UK3A, and A. Lysikov, the engineer of the same station, took off on reconnaissance to the settlement of the Mary energy workers, located several kilometers from the oblast center of Maryyskaya oblast. (The oblast center is the city or town of Mary itself; Maryyskaya oblast is no.44 in the "R-100-0" listing.) That was the place where, according to data furnished by the monitoring service, two amateur stations, a collective station UH9EWW and individual station UH8EA, operated with similar signals, like twin brothers, audible in Moscow "59 with many pluses."

Amateur antennas reaching up nearly 30 meters were visible from far away. There was no doubt that thy belonged to UH9EWW, the only collective station here; an individual station operator wouldn't be in a position to put up such an antenna.

The controllers decided to test their supposition. Like people on an excursion they wandered around the settlement, looking at the roofs of houses grown over with antennas. (Apartment buildings with a multiplicity of television antennas on their roofs, perhaps a rough approximation of the number of family units in them, are frequently sight in the USSR, hence, possibly, the "grown over with antennas" image.) Among the television antennas amateur antennas were visible in some places - a beam, a vertical, an inverted V, a dipole stretched between two buildings. But an antenna complex with which one additional station (i.e. UH8EA) would have to be equipped was nowhere to be found. The pieces were now beginning to fall into place.

On Saturday, turning on a receiver they had brought with them, the controllers immediately heard an interesting "individual station." Its signals were audible even on the MW band. After monitoring it for some time, they, at the very height of the championship, set out, without a moment's hesitation, to the builders' trailer standing at the edge of the antenna field they had seen the day before.

Inside, total chaos. Dirt all over. Dust covered equipment on racks. Slapdash electrical wiring. ...Opposite the entrance a low metal box open almost all around, to which a coaxial cable led. Two powerful GU-43's cooled by ventilators.

The operator and his youthful assistant were so engrossed in operating, the individual callsign (UH8EA) was going out over the air, that they didn't immediately pay attention to the visitors. When the older man recognized what sort of guests were visiting, his expression changed. Evidently he felt that his "luck in sports" had come to an end. In front of the Central Radio Club workers stood none other than V. Pecherkin, UH8EA, ex-UH8EAA, many times national shortwave radio communication champion and winner of many prizes in competitions; he is also Chief of collective station UH9EWW.

The case involving Pecherkin created a sensation among many with whom your correspondent happened to talk in Turkmeniya. They couldn't imagine how the Chairman of the oblast Federation of Radio Sport and the Chief of the Club of Young Technicians attached to the Palace of Culture of the Mary energy workers could suddenly turn out to be ...a phony champion. They had considered him a principled, conscientious person, respected by leaders and the pupils of the Club of Young Technicians.

What happened with Percherkin didn't occur overnight. Collective station UH9EWW, as A. Kucherenko, its Deputy Chief, admitted to me, had been operating for a minimum of about one and half years with an amplifier using two GU-43's, i.e. with an output power of about three kilowatts. For a long time there hasn't been an antenna on the building where Percherkin lives, yet he regularly operates with his individual callsign from the club station.

Why didn't anyone want to discern the flaw in the character of the "champion"? Why didn't they put a stop to the violator's actions in good time? Even a month after the above events took place, neither the oblast nor the republic DOSAAF committees had taken measures against the "champion." Yet these two organizations were informed about what happened by the telecommunication inspectorate, which simply as a staff matter is supposed to put a stop to any violations by radioamateurs, is simply incomprehensible. Its chief also knew of the results of the inspection, yet for some reason did not give orders to place a seal on the overpowered amplifier. The station has since used it in regularly scheduled competitions.

After returning to Moscow I learned that the Presidium of the Federation of Radio Sport of the USSR had taken up the question of violations by V. Pecherkin of shortwave radio communication competition (contesting) rules and of the instruction on the operation of amateur radio stations.

The FRS USSR asked the Central Committee of DOSAAF USSR to petition the State Committee of the USSR for Physical Culture and Sport to deprive V. Pecherkin of the title "Master of Sport of the USSR."

At the request of the FRS USSR, the State Telecommunication Inspectorate of the Ministry of Communication of the Turkmenskaya SSR cancelled the license issued to V. Pecherkin to operate individual radio station UH8EA and closed collective station UH9EWW for three months. In addition, the republic inspectorate closed A. Kucherenko's station for three months.

We could end the story here, but first some conclusions.

The lack of control in off-site radio competitions gives rise to improper phenomena such as those uncovered in Mary.

The existing monitoring service can only identify certain types of violations. Just try, for example, to prove that an operator of an individual station had a helper (logger) or that a "dummy player" took the place of the team of a collective station. It is not a simple thing to struggle against excessive transmitter power.

What should be done in these circumstances? It seems to me there's just one possible conclusion: the title of radio communication champion should be awarded at on-site competitions only, and that of master of sport of the USSR should be based on the results of on-site meetings only. How many on-site meetings of shortwavers (need be held) at the National, republic, kray, and oblast levels should be decided by federations of radio sport and by the corresponding DOSAAF committees. (The PVRC Newsletter)

DEALING WITH OFFICIALS

Chuck Clark, K4ZN

Amateur Radio's public service activities usually involve dealing with officials. It could be the governor of the state, the sheriff of the county, the mayor of the city, or it could be the chief of the local volunteer fire department, or the person in charge of a Red Cross shelter. In any case, the effectiveness of our service will depend on our relations with that particular official.

Some of the officials have had previous experience with amateurs, know what we can accomplish, and welcome our help with open arms. Such relationships pose only the problem that we live up to expectations. In other cases, however, we have to sell ourselves. To succeed, we should use techniques that make salesmen successful.

First, know your "customer." Selling involves persuading the customer that what you have to offer is worth more to the customer than what it will cost. Note that I did not say telling the customer, but persuading. It's not the objective fact that is important, but the customer's perception of that fact. So the first thing you have to do is to determine what will open the customer's mind to what you have to say, and then you have to present your case in a way that will convince your customer that accepting your offer is the best thing to do.

Of course, each official is unique, and what will open the mind of one will cause another to slam the door in your face. But there are some things that officials have in common that will greatly increase your chances of success if you bear them in mind.

Officials are busy people, or at least should be. For most of them a forty-hour week is a joke. So the first sales problem is to get the official to recognize that it is not a waste of time even to listen to what we have to say. If you know someone who can put in a good word for you, that could be the best way to surmount this first hurdle. Or write a letter saying what you have to offer to meet that official's specific needs, and asking for an appointment. First impressions are important. Be sure the name is correct and spelled correctly and that you are contacting the right person (it's usually best to start at the top and work down, top officials can always do anything that any of their subordinates can, they can cut through red tape, and often are more likely to be open to new ideas). Put it on some kind of letterhead, such as ARRL, Red Cross, Civil Defense, MARS, to help it over that first hurdle. You might refer to recent emergencies where Amateur Radio could have been of help, or occasions where your group helped others (and they need not be emergencies, providing communications for events like races, regattas will also show what you can do). If you can point out a potential communications need that Amateur Radio alone is capable of supplying, mention that. And don't forget to say that the service is free, really free, no strings attached. Give a telephone number so that the official's secretary can contact you. Remember, it costs five dollars or more for a businessman to dictate a letter, and much less to handle something by telephone.

Because officials are busy people, especially during an emergency, that is not the time to contact them. Make your contacts when things are quiet. Put yourself in the shoes of a civil defense director who has two telephones ringing, a radio squawking, everything in a state of confusion, and then some complete stranger comes along and says he can make contact with the state capital if needed. Would you want to entrust important messages to someone like that? It could be lost, garbled, delayed, and would the addressee accept it as genuine? Make your contact in advance.

Be on time for the appointment. But also be prepared to wait. Officials in such positions often have problems that require immediate action and so they must postpone everything else to act on them. It depends on whether the official is the kind that does everything or the kind that does nothing ("My job is to get things done"). When you meet the official, if you were specific in your letter, or if your contact person has already explained what you are doing, it should not be necessary to say much to the official. Merely a brief reference to the letter or to the one who made the contact and a word that you are there to answer any questions and to discuss how you would help, whom to contact, and what the official can do to inform people in the organization that you have agreed to help.

You may have some questions, but it's wiser to ask only such questions as you would expect the official to be able to answer. I recently participated in a large civil-defense meeting where federal, state, and county officials, plus Red Cross, Amateur Radio, and other volunteer groups discussed a planned drill simulating a five-county-wide major disaster. I was a bit embarrassed when two of the amateurs present made the mistake of asking officials about matters that the amateurs themselves should have settled, things like what frequencies to use, what repeaters, what modes. We are providing the communications link, and our link functions best if it is transparent, if the users can leave all the details to us and concern themselves only with what they have to say, letting us see that the message gets to its destination rapidly and accurately. Officials are embarrassed when you ask questions they are unable to answer, and officials, like the rest of us, don't enjoy being embarrassed. In short, we should give answers rather than ask questions.

In dealing with officials, never forget that they are officials, that they carry the responsibility, and that we must defer to their judgment. Some are leaders, some are drivers, some are competent, some are examples of the Peter principle, have reached the level of their incompetence and the organization is now stuck with them. But any of them can profit from our help if they can see that we are only there to help them fulfill their duty, and

that we are fully supporting their authority.

One thing that we must make clear, however, is that Amateur Radio is ready to help anyone during an emergency, we do not commit ourselves to serve any organization exclusively. We may indeed assign operators to particular agencies, we may set up closed circuits between locations served by a given agency, we may even assign a given repeater exclusively to traffic of a single organization, but such decisions are made by the Emergency Coordinator as need arises and are not made the subject of an agreement in advance or determined by the agencies we serve. We retain control of the Amateur Radio spectrum and use it in such a way as to benefit the most people the most effectively.

It must be understood that we are there as communicators, not as gofers. While we may render other assistance, it must not interfere with our primary function, communication. On the other hand, our operators must resist the temptation to originate communications. We provide the service, the officials provide the communications. And it is also important that the official we contact makes sure that the subordinate officials with whom we will have to deal in an emergency know that we are there to help and that they should use our services freely.

And of course, never forget that we are amateurs, and avoid anything that can compromise that status. Yes, we may accept anything that is offered to us in the way of food by the Red Cross, just as any other volunteer worker may. We can accept electric power for our rigs from whatever source it is available. We could even accept an old truck to fit out as a communications van as long as it is clear that it is for communications for the benefit of the entire community and not merely of the donor, and it does not become the property of any individual amateur.

Finally, when the emergency comes, if we handle it competently, if we can say we are amateurs only because we are not paid, in other ways we are truly professional, we won't have any trouble dealing with the officials concerned whenever we have occasion in the future. They will remember the efficient communications, the resourcefulness of the hams in solving problems, and will want us back next time. (K4ZN)

JR6NWN (L) and N2GKL operating 4U1UN in CQ WPX

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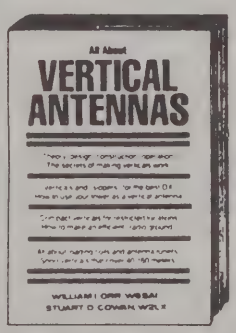

by Bill Orr, W6SAI and Stu Cowan, W2LX

Smart DX'ers know that the vertical antenna can be the secret to low band DX success. Until now, most books gave at best a cursory overview and a couple of projects for the vertical. Ham Radio's well known columnist and book author Bill Orr, has now given the vertical the kind of attention it deserves in his own popular style. Theory, design, construction, operation—all the secrets of making the vertical work—are fully covered in clear concise easy-to-read text. Orr is a master at making the complex simple and this book is no exception. Here's just a sample of what this exciting new book covers: Horizontal vrs vertical—which is best? Top loaded and helical antennas, 5 high efficiency Marconi antennas for 80 and 160, verticals and TVI—Is there a problem? The effects of ground on vertical antennas and a how to make an effective ground system, The Bobtail beam, construction data for 25 different antennas, matching circuits of all descriptions—which is best, plus P-L-E-N-T-Y more! For years Hams having been asking for this book. Get your's now. You won't regret it! © 1986, 1st Edition.

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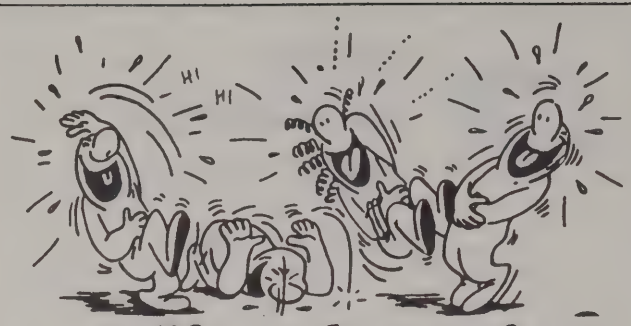

radio funnies

Mike Crabtree, ABØX

THEM RUSSIANS SURE WERE LOUD!

Monday evening just after the ARRL CW DX Contest WDOSRI dropped by my QTH for one of his unannounced visits. As we headed for the shack I picked up a couple of 807's for the almost certain long evening ahead. As usual he took the soft chair in front of the rig and left me the broken wicker chair usually reserved for the family cat. Elmer seemed to be in high spirits as he turned the conversation to his contest effort almost immediately.

"I just had to come by and tell you about my 160 meter effort in the test," Elmer began enthusiastically. "Wow, I worked some really good stuff on 160," he exclaimed.

Being a Low Band DXer myself, I had to ask: "What did you work?" I should have known better.

"Well, I worked some routine Caribbean stuff such as VP2s and VP9, etc. But what was really exciting was who called me," he said as he tipped his 807 and belched profoundly. Of course, I asked "Who?"

"You see, I was calling this KP4 when UP2KHZ began calling me! I couldn't believe how loud he was. I worked him and started calling the KP4 again. That's when UP2LID called me. Of course, I worked him too. Boy, them Russians were loud!" he exclaimed,"they sounded like locals."

"Well," was all I could get before he took over again. "I figured if I was getting out so good why not just call CQ Contest," he explained, "so, I parked on 1827 and hit the magic button on my KC Keyer. Sure enough it wasn't long be fore I worked another new country. It wasn't a Russian but it was just as good. COORS called me. He said to QSL to 'ole Dean, WAOTKJ. He didn't go to Cuba for the contest did he?" he asked.

"I think you worked Slim," I said softly trying not to fracture his delicate neophyte character. "Well, I didn't get his name," he continued, "Next, RG8X called me. You know I seem to work him in every contest!"

"I bet you do," was all I could get out without choking.

"But it wasn't easy holding frequency. 1827 is a very busy spot," WDOSRI explained, "several times I heard people send "QSY! QSY!" after I'd call CQ. Guess they wanted a chance at that good frequency!"

"Probably so," was all I could say before he began again. "5U4GB answered by CQ next, followed by 6LQ6 for new countries in Africa. I worked UR2DUM next. Boy, them Russians sure were loud!"

I got Elmer another cold 807 and began explaining as carefully as possible that he had been tricked. I even explained who Slim is to this naive newcomer to the world of DX contesting. Actually he took it pretty well.

As he headed to the door to leave he looked down at his feet and said, "You don't think any of those guys who called me were from the DX Club, do you?"

"Of course not," I reassured him, "none of our guys would ever do anything like that." Half smiling he said, "Good, because I've kind of suspected some of them since that night they called me around midnight on 2 Meters to work EP2TY on 10 Meters."

"Well, it must have been exceptional band conditions," I said trying to keep a straight face after this revelation. As he went out the door he mumbled: "It's a shame, 'cause them Russians sure were loud!" ———————— (ABØX)

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LIVING WITH "GARBAGE COLLECTION"

Pete Smith, N4ZR

This is the third in a series of articles written especially for RADIOSPORTING on computer programming for contesters. The focus is on modules from which contesters can build their own programs. Examples are drawn from Commodore 2.0 BASIC (as used on the C- 64).

In his article in February RADIOSPORTING, Ben Buettner, DL6RAI ends with a cautionary note about avoiding "garbage collection." But what is it, and how is it relevant to design of a contest program?

Have you ever had your computer stop dead in the middle of a large sorting program or some other string-intensive function? Suddenly even the RUN/STOP key won't work, and you might well conclude the program had crashed. More than likely, you've just encountered garbage collection.

Much of the following is drawn from the excellent book Programming the Commodore 64 by Raeto Collin West (Compute! Books, 1985).

BASICs (Commodore BASIC is typical) store string variables in program lines - for example, if the line

```
10 HC$="WA3ABC"
```

is part of your program, then no further storage space is required for HC$. However, if you redefine HC$, with HC$=A$+B$ or INPUT HC$,

for example, then the new value of HC$ is stored at the top of BASIC memory. If your program defines it again, then the new value is stored sequentially after the first one, and after any that have been stored dynamically in the meantime. But the old value is not deleted in the process. The same thing is true if a string is assigned to a location in a string array, as happens in the duping program discussed earlier in this series. Using variable names instead of the contents, BASIC memory begins to fill up with something like: ABCDADAA...

BASICs do dynamic string storage this way so that it is not necessary to specify the length of each string variable in advance. But the downside is that a program that redefines strings frequently is very wasteful of string space.

To handle this, BASICs have a command FRE(0) which carries out garbage collection. Essentially, it looks at each variable that has been defined, finds the latest value, and discards the rest. A similar function is carried out automatically, at least by the C-64, when it tries to store a dynamic string variable and finds it has run out of space. That's when your keyboard locks, RUN/STOP doesn't work, and it looks as if it's crashed. It hasn't though, and if you wait long enough it will generally finish garbage collecting and pick up where it left off.

Fine, you say - but that can't take very long, can it? Well, that depends. The amount of time required for garbage collection is proportional to the number of different string variables being "collected." With the C-64, 100 strings take about 0.9 seconds, 200 take over 3 seconds, and 300 take over seven seconds. Obviously not a linear relationship.

In practice, if a real-time duping program created only a few dynamic strings, the delay for garbage collection would be scarcely noticeable. The rub comes if, like both Ben's and my approaches, you use a string array to store the calls of stations that have been worked. Each

```
A$(J)=HC$
```

statement counts as a separate string. Suppose you work 1200 stations? Then the time required for garbage collection will be approximately 1 minute 55 seconds, while for 2400 calls the time rises to 7:35. Clearly that's an unacceptable interruption, especially if you can't choose when it happens.

To see garbage collection in action, we can use a simple program to generate a series of redundant strings.

```
10 A$="This is string A."
20 B$="This is string B."
30 C$=A$+B$:B$=A$+C$:A$=B$+C$
40 GOTO 10
```

Run this program and it will continue to loop until it runs out of memory, at which point garbage collection will occur. Since only 3 strings are involved, the pause will be very short, and processing will resume, forever.

Now add a line

```
5 DIM A$(2000)
```

to set up a large array and substitute the following for line 30:

```
30 A$(X)=A$+B$:PRINT X:X=X+1:IF X=2001 THEN STOP
```

The modified program will fill the array, putting the combined string "This is string A. This is string B." in each array "slot." Well before it reaches 1000, garbage collection will occur, only this time will take over a minute. Your computer will then continue until it finishes filling the array, probably stopping along the way for an additional garbage collection. This time, because almost 2000 strings are in memory, the garbage collection will take over 3 minutes.

There are at least two possible solutions to the problem of garbage collection delays. The obvious one is to come up with a means of storing unique numbers equivalent to callsigns in a numeric array. This technique is used by Overbeck and Steffey, but their algorithm has some other weaknesses. Another approach, the one I use, combines a technique to slow down the accumulation of string variable "garbage" and a means for the operator to decide when garbage collection takes place.

The first is a trick to cause the computer to forget that it has generated certain dynamic strings. This way, you can avoid using up so much string space by routines that manipulate strings a lot but don't refer to them again, such as CW sending routines.

The principle is simple. In the C-64, RAM memory locations 51 and 52 (decimal) contain pointers to the bottom location of the last dynamic string variable stored in memory. Before starting a string-intensive routine, insert a line like:

```
LX=PEEK(51): RX=PEEK(52)
```

This stores the values of the pointers in memory. After the

operation is complete, insert the line:

POKE 51, LX: POKE 52, RX

And voila! It is as if the computer never did the operation at all.

There are pitfalls: if you need to store a call-sign in an array, for instance, you must do so after the POKE line, and you must make sure that the call-sign entered RAM before the PEEK line. Otherwise, the PEEKing and POKEing will wipe it out, and nothing useful will be stored in the array. In practice, I do not find this too serious - it means that roughly twice as many bytes of RAM are used to handle the data for a QSO than the absolute minimum (roughly 8 bytes). And when you do finally do a garbage collection, the extra bytes are freed.

Another pitfall is that playing with memory pointers can be tricky. It's easy to move the wrong pointer at the wrong time, or to create a path in your program that confuses the PEEK ... POKE relationship, corrupting a variable that you will need later. These days, most of my debugging time is spent making sure that changes in program flow don't trigger this sort of problems.

The second step in garbage control is to collect when YOU want to, not when the machine does. My solution is to incorporate a selectable garbage collection routine in my programs at the most convenient time. For Sweepstakes and other contests with enforced time off, the easy way is at the beginning of a logged rest period. Even when logged rest periods are not required, doing garbage collection whenever you take a break is a good way to avoid running out of space. I usually recommend that operators go no more than 500 QSOs with my software without taking a break to compress memory (and for other reasons, maybe).

For such a command,the syntax is simple:

X=FRE(0)

is designed to give a readout of free memory space, but it also performs garbage collection first. Insert this line, put a message on the screen like "CLEARING MEMORY" to tell you what's going on, and once it's finished the program will continue.

I believe these techniques are applicable to other interpreted BASICs as well, and should help you keep the garbage under control. Remember, the worst that can happen is that the machine does a garbage collection on its own, forcing you to take a break. If you get an error message

"?OUT OF MEMORY ERROR IN ...",

don't panic. Enter

X=FRE(0)

in direct mode (without a line number). When the screen says "READY", return to the line cited in the error message (with a GOTO, not a RUN, so you don't lose the contents of your duping array) and you're off and running again.

NEXT: The accurate real-time clock in the C-64. (N4ZR)

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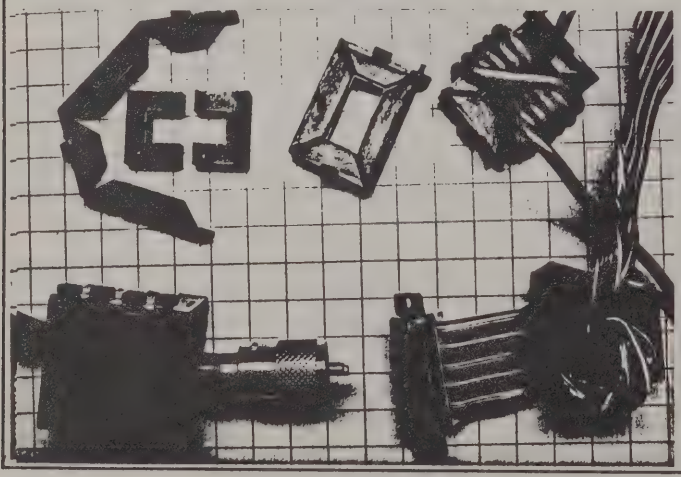

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rtty contesting

John Devoldere, ON4UN

Each year I have said: "I must do it." Here it is. Some recipes for successful operating in RTTY contests.

Between writing books, articles and software, between DX on the low bands (now also 160 meters), about 5 hours of sleep a day (did I say night?), a demanding and very stressing job, I find the time to operate a few hours of RTTY every year. The past five years I have been participating in one of the major and certainly the oldest RTTY DX contest, the BARTG contests (usually 3rd weekend in march). Successful contest operating (any contest) is to a great extend a matter of planning and organization, as well as some good common sense.

Let me explain with the example of the BARTG contest. The required exchange format is: RST plus serial number plus UTC time.

Today there are very few, if any mechanical RTTY machines left over in amateur service. Most of us have solid state equipment with a variety of memories that can be put to good use in a contest.

My RTTY equipment is certainly not the most modern. But performance-wise I still regard it as the best. I use a Dovetron MPC 1000 MKII converter together with a HAL CT2200 Communications terminal. For AMTOR I added the G3PLX MK2 AMTOR converter. The whole setup may be a little bulky but works like a charm.

The HALL CT2200 has 8 RAM memories and two "HERE IS" (low capacity easily programmable RAM) memories. Before the contest I program the memories as follows:

1. (NL)CQ TEST DE ON4UN ON4UN ON4UN ON4UN CQ TEST AR
2. (NL)QRZ TEST DE ON4UN ON4UN AR
3. DE ON4UN
   RST NR GMT
4. (NL)599-
5. (NL)QSL? BK
6. QSL 73 OARS DE EON4UN AR
7. (NL) REPEAT EXCHANGE PSE
8. DE ON4UN AR

(NL): equals New Line

The two "here is" memories (called A and B) are easily accessible during operation for continuous reprogramming. They are used to store calls, times and serials numbers as follows:

A: (NL)CALLSIGN e.g.:(NL)AA4AA
B: number-UTC time e.g.:034-1415

Let me now explain the entire operating procedure:

Calling CQ: select message (1). Watch the content: the words CQ and TEST are used once at the beginning of the call and once again at the end (it's obvious so let's not fill the line with garbage). Your call needs a few repeats though. The CQ TEST at the end of the line is for the guys who tuned in the middle of the line and wonder what the series of callsign are all about. Don't send your call more than 4 or 5 times. Keep the calls short. Only one line, and end the CQ with AR or maybe PSE K. Don't use the KKKKKKK stuff. Looks like stuttering.

Let's assume AA1AA comes back to your call. You see someone sending your call (hopefully not 5 times?!). While this is happening you start programming your (A) and (B) messages: write (NL)AA1AA in memory (A). Watch the clock, notice the time (14:15 UTC) and the next serial # (034) from the log. Now type 034-1415 into memory (B). With some practice this will be done before AA1AA finishes his call.

When it's your turn to transmit enter the following (memory) key sequence:

B 3 4 A 4 A 4 A 5

On the screen it will look like:

AA1AA de ON4UN
RST NR GMT
599-NR-1415
599-NR-1415
599-NR-1415
QSL? BK

There are of course variants to the above scheme. You may want to give the exchange only twice or maybe four times as required (twice is enough if signals are really strong with no QRM Around). You also may want to repeat the correspondent's call at the end of the over. The key sequence would then be: B 3 4 A 4 A 4 A B 8

A few remarks are in order here:

- don't waste time repeating your correspondent's call. I am sure he knows his own call. Once at the start of the transmission and maybe again at the end is certainly enough.

- Once you have been called there is no need to give your call more than once every transmission.

- Always give the exchange message in the sequence and form as shown above. Do not give a line full of RST's, another line with GMT's and finally a line with serial numbers. If QRM pops up it will likely black out (hopefully only) part of your transmission. If the message looks like:

RST 599 599 599 599 599 NR 034 034 034 034 034 GMT 1415 1415 1415 1415 1415

Murphy will most likely make you loose an entire line (either the RST, NR or GMT line). In that case it could look like:

RST 599 599 599 XCDXCDC
JHGJHK UY GHUIGIUZSUZX HIUY1415 1415 1415 1415

So you got part of line 1 and 3 but no serial number. If properly formatted, with the same QRM the screen would have looked like:

599-034-1415
ASAG 6 F CVSA QWHHO34-1415

Well, here I have all the information I need. Convinced?

One more thing: Notice the "-" between the figure groups. Make sure you never use a space between figures

groups. Spaces are lower case characters. Figures are upper case characters. If you use spaces between the figure groups the equipment must continuously insert codes to shift from upper to lower and from lower to upper case. First of all it takes time to transmit these extra codes (notice how the printing of the symbols on the screen stops when this shifting occurs). The group 599 034 1415 takes 33% longer in time to transmit as compared to the group 599-034-1415. Image 33% more QSO's in a contest! Or 33% more time to transmit valuable information to beat the QRM!

Very often (which means mostly according to Murphy), your equipment will not receive the LETTERS SHIFT or the FIGURES SHIFT codes. In such a case a line might look like:

599 TOO TOO TOO PER PER PER PER QRQT QRQT QRQT QRQT

It's always good to have a conversion list for the figures/lower case characters:

1 = Q
2 = W
3 = E
4 = R
5 = T
6 = Y
7 = U
8 = I
9 = O
0 = P

The character to be inserted in between the groups of figures does not have to be a "-", it can be any character belonging to the upper case characters (e.g.: . , / etc).

Very often one still can see transmission starting with RYRYRYRYRYRY.... This was sensible only when we were all using mechanical machines, in order to get proper machine synchronization. No need for anything like that with electronic equipment. RYRYRY's are just waste. Lost time. Lost QSOs. Lost DX. Please do not use it.

Then there are those who have equipment that automatically generates date plus time. Inevitably they transmit the entire group in the contest. Only the time is required. Please do not do it. We all know your fancy equipment has all the bells and whistles. No need to give the state either. And I know you wish me good luck in the contest (at least I assume, and if you would not, you would not tell me anyhow!). So cut out all the waste in a contest.

Using the method as described above it is possible to maintain a rate of 1 QSO per minute when conditions are good and the operators reasonable.

For the BARTG contest I also use a real-time duplicate checking and logging program which I wrote for my Apple IIe. Real time dupe checking and logging systems are really applicable to RTTY (and maybe VHF) contesting, where the QSO rate makes the use of a real-time system possible in a single OP environment. The main features of my program are:

- the program can hold approximately 1200 QSOs, which is enough for a RTTY contest.

- the program makes use of a data base containing all known prefixes, related to a country. This data base can easily be updated by the user before each contest or even after the contest (new or special prefixes). This data base is needed for automatically calculating the final score.

- QSO entries are made in real-time. Search for duplicates takes no more than about 2 seconds with 1000 qso's in memory. For this the Apple 2e : is equipped with a 4MHz accelerator board and a RAMcard.

- When a call is entered, the screen tells you whether it's a dupe or not. If not it will also tell you which bands you still need that station on (ideal for making skeds or QSYing to other bands).

- During the contest one can generate print-outs such as:

- band listing: stations in alphabetical order per band.
- alphabetical listing: listing of all worked stations in alphabetical order with 5 columns showing the bands worked.
- country status: the Country list showing the number of qso's for each country per band (again 5 columns).
- chronological print-out: the log. As the computer has an internal clock card there is no need to enter the time from the keyboard.

During a break (the BARTG contest is a 36 hour contest with maximum 3 break periods), one can have the program calculate the relative value of working multipliers or just ordinary (non multiplier) qso's. This is a very valuable tool to decide whether to look for new multipliers or just try to work stations (a new multiplier may be worth 7 stations, which is a lot if you cannot run a pile-up or when you have exhausted the band.

At the end of the contest it takes about 30 minutes to calculate the final score (points, multipliers etc), to print out the log, the dupe sheets (there are no dupes, but I submit the per band listing), the country listing and the alphabetical listing, and the required summary sheet.

The program is not available commercially nor do I intend to do it. There are too many different types of Apple computers, and my program is written for a very specific hardware combination of accelerator board, RAM Board and clock-card. Also the program does need a little more refining to meet my standards of publication. Excellent dupe checking programs have been publicized in RADIOSPORTING and can undoubtedly be adapted to make a perfect program for RTTY contesting.

Good luck in the next RTTY contest! (ON4UN)

Kan Mizoguchi, JA1BK and John Scarvaci, W9GIL.

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NOVICE DIGIPEATERS

Section 97.85, just added to the FCC rules in the novice enhancement docket says in paragraph (i), "No station at which the control operator or station licensee holds a novice class operator license shall be in repeater operation." And section 97.3 (l) defines repeater operation as "...retransmitting automatically the radio signals of other amateur radio stations." That would seem to say that novices are not allowed to operate digipeaters, packet stations that relay signals from one packet station to another.

But the word is out that the FCC does not intend to enforce this interpretation, at least for the present. The ARRL LETTER says that FCC staffers advise that the present status of packet is so new that it would be unwise at this time to make rules to govern it. Rather it seems better to let things take their course for a while, and then, if the FCC doesn't like the course things are taking, do something about it. And so for the present it seems that there is no objection for a novice to operate a digipeater. As ARRL LETTER points out, prohibiting novices from operating a digipeater could prevent a novice who has an excellent location from making it available to packet networks as a relay point.

Actually there is a difference between repeaters as we have known them and digipeaters. Repeaters simply transfer the modulation envelope from the receiver to the transmitter, while digipeaters transfer the actual message, and often take action as directed by the message they receive. It might seem that a higher class of license would be required for a digipeater because it performs a much more complex operation, but the opposite is true, because the operation of a digipeater is so complex that most of us couldn't do it and so we depend on our hardware and software to handle it, while repeaters depend quite heavily on their operators' skill for proper performance.

THE SECOND R IN ARRL

This new development, packet, may bring us back to the beginnings of Amateur Radio, but with a new twist. We'll have a nation-wide traffic system (and worldwide as far as third-party agreements will allow) that will make it possible to handle traffic anywhere in a matter of minutes with one hundred percent accuracy at any time of day or night.

Back in the days of spark, especially before World War I, the range of most amateur stations was about that of VHF stations today. If you wanted to communicate over longer distances you had to have your message relayed. It was this need that moved amateurs in the Hartford, Connecticut area to found the American Radio Relay League, and the League succeeded in organizing the relay efforts of amateurs throughout the U.S., making it possible for messages to be passed throughout the country, a skill that proved invaluable when the U.S. entered World War I in 1917.

After the war, Amateur Radio began where it had left off, and the old idea of relaying again took hold. But CW was replacing spark and vacuum tubes were replacing crystal detectors, and ranges were rapidly increasing. And within four years amateurs had discovered the value of short waves, they soon were able to communicate without relays anywhere in the world, and with simple, inexpensive equipment too. The era of relaying was past, now it was DX that most hams sought.

But there were some who liked the old way and kept it alive. And there are still some, maybe one-half of one percent of active amateurs for whom handling traffic is a significant activity, amateurs whose aim is not making contacts in remote places under unusual circumstances or trying to see how many different countries, states, counties they can contact at least once, but rather being able to provide reliable communication anywhere at any time, either directly or through relay.

They operate mainly through a system of nets, or perhaps better through two systems. There is the National Traffic System sponsored by the ARRL, together with the independent nets that use the same procedures, and there are the phone nets that operate mainly on twenty meters and that use a somewhat different procedure, do not generally handle formal traffic but do provide a much-used phone patch service.

Crowded as our amateur bands are, it would be inevitable that there could be some friction between traffic handlers and other amateurs, made worse because their interests are different and each can see the others as a class. Traffic handlers can see themselves as providing a public service, doing it regularly every day at specified times and on specified frequencies, and so be not to kindly disposed to people who call CQ on the net frequency or to the contesters who pack the entire band from bottom to top and make traffic handling almost impossible. And conversely, other amateurs can have hard feelings about nets too. They are band hogs, think they have a right to their frequencies, are prime sources of QRM, and handling traffic isn't what Amateur Radio is all about anyway. We aren't Western Union.

Maybe not. But traffic handling does have a long history in Amateur Radio. And nets actually reduce QRM: it would be worse yet if all the hams in a net were involved in QSOs instead. On a net only one of them is on the air at a given time. In QSOs, half of them would be on the air, maybe more if some of them were calling CQ. The real problem is that some nets do seem to feel they have a claim on their frequency and expect anybody operating there to move when the net starts. If there is a clear spot sufficiently close to the net frequency, the net control station should begin the net there. Yet it is true that you can't move too far away from the established net frequency, or many members might not be able to find you. A better way to do it is to have some stations who plan to check into the net start operations some time before the net actually starts, conduct an informal round table on the net frequency, and then turn it over to the net control station when the time to begin arrives. In that way nobody's feelings are hurt, the net is in its usual place, and QRM may even be reduced.

As for the public-service value of traffic handling versus other amateur activity, it would be erroneous to identify any activity as essentially higher in rank than any other. CW traffic people can point to a long list of accomplishments, but most of them will go back to the earlier days when most hams operated CW. Phone traffic people can point to more recent accomplishments, many of them outstanding, and to the fact that they have better coverage of the U.S. because of their widespread distribution. But other amateurs provide service too, and it is often they rather than the traffic hounds who receive the first news of a disaster. There are always amateurs on the air within range on some band from just about any place on earth, and they are ready and willing to make the contact that the emergency requires. All of us can contribute, our very number is one of our strong points, and our diversity of interests is another. Yes, there is competition in Amateur Radio, but cooperation is its real strong point. (K4ZN)

ON4UN
LOW BAND DXing

SOFTWARE

This is a collection of professionally written software which is dedicated to the serious DXer and more so to the LOW-BAND DXer. The software is s complement of ON4UN's new book LOW BAND DXing, to be published soon (Summer 1987) by the ARRL. By itself it is a collection of unique design programs for LOW BAND antennas and arrays (vertical array pattern calculations, matching networks, transmission lines, phasing,etc.), as well as operating tools of very high precision. Grayline calculations (sunrise, sunset), distance and bearings to DX locations (500 locations in data base, prefix, city, country, or use coordinates). 30 menu driven programs are packed on a diskette accompanied by the users manual.

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RADIOSPORTING is looking for articles, pictures and news items. Also needed are leaders for the following departments: DX Monoband Reports, Satellite, RTTY, PACKET, Computer Hardware/Software, SWL, Contest Results and Records, Club Life, etc.

FCC NEWS

Bill Grenfell, W4GF

IN REGARD TO FCC'S PROPOSAL IN GENERAL DOCKET 87-14 TO ALLOCATE THE 220-222 MHz PORTION OF THE 220-225 MHz AMATEUR BAND TO THE LAND MOBILE SERVICE, THE ARRL HAS ASKED FCC FOR INFORMATION ON THE LAND MOBILE SERVICE AS FOLLOWS: "1) Any and all documents relating to or constituting a 1985 Field Operations Bureau report or reports concerning land mobile spectrum occupancy and assigned frequency use in ten of the largest land mobile markets. "2) Any and all documents relating to a 1983 report of the Office of Engineering and Technology (formerly the Office of Science and Technology) concerning the projected spectrum needs of the Land Mobile Service. "3) Any and all documents relating to a 1983 report of the Office of Plans and Policy concerning the projected spectrum needs of the Land Mobile Service." As a result of the League's request for an extension of time for comments, FCC has established 05/21/87 as the new deadline for original comments and 06/19/87 for reply comments. Comments should refer to Docket 87-14 and an original and five copies sent to the FCC, Washington, DC 20554.

"IN THE MATTER OF PRIVATIZATION OF (A) SPECIAL CALL SIGN SYSTEM FOR AMATEUR STATIONS" THE ARRL HAS FILED WITH FCC A "MOTION FOR EXTENSION OF TIME FOR FILING COMMENTS AND PROPOSALS." "The instant request is sought in order that a full understanding of all ramifications of a 'private' call sign system are fully understood by the amateur community, and by those interested in submitting a proposal to be a special call sign coordinator." After citing a number of reasons for delay (including omission of a paragraph from the Federal Register copy of PRB-3), the League requested the time in which comments and proposals may be filed be extended from the 04/23/87 deadline to and including 07/31/87. Early in April, an extension was "in process".

"...THE FCC SEEMS TO RECOGNIZE A DISTINCTION BETWEEN PACKET DIGIPEATERS AND 'NORMAL' REPEATERS." "In discussions with ARRL officers and staff, FCC officials indicated that they plan to take a wait-and-see attitude toward making a determination of appropriate service rules for packet." "The FCC is willing, indeed anxious to accommodate packet technology within the rules, but not without a firm basis for rule making." (ARRL Letter, 03/10/87).

FCC HAS CANCELLED THE CERTIFICATION OF A NEW YORK BASED GROUP AS A VOLUNTEER EXAMINER COORDINATOR. The group had been certified as a national VEC but had never held examinations outside of the second call area. "The revocation was due to delays in forwarding examinations to the Commission and failure to respond to Commission correspondence." (ARRL Letter)

THE FCC HAS FORWARDED TO ALL VEC'S A "DRAFT COPY" OF THE NEW FCC FORM 610, "APPLICATION FOR AMATEUR RADIO STATION AND/OR OPERATOR LICENSE.". The new 610 provides for: 1) certification by the -two- administering Volunteer Examiners (VE's) for the Novice examination and, 2) a revised administering VE report for examinations administered under the Technician and higher VE/VEC system. FCC's Notice indicates that the previous 610 versions (June '84, July '85) "...will remain in use until revised forms are available." (W5YI Report, 03/15/87).

EXPECT FCC TO SOON REVISE SECTION 97.67(h) TO CHANGE THE MILITARY AREA FREQUENCY COORDINATOR FOR ALASKA AND NORTH DAKOTA TO PETERSON AIR FORCE BASE, COLORADO. Part 2, Section 2.106, US7, has been so modified. 97.67(h) describes the areas wherein Amateur use of the 420-450 MHz band shall not exceed 50 watts transmitter power "...unless expressly authorized by the..." FCC. (ARRL Letter, 03/24/87).

THE ARRL WILL SOON PETITION FCC TO AMEND RULE SECTION 97.313 TO PERMIT ALIEN AMATEURS OPERATING IN AREAS UNDER UNITED STATES JURISDICTION TO IDENTIFY THEIR STATIONS BY TRANSMISSION OF THE US CALL AREA IN WHICH THEY ARE OPERATING -FIRST- FOLLOWED BY THEIR ALIEN CALL SIGN. For example, "W4/DL6TJ" instead of "DL6TJ/W4". The reverse order is now specified in 97.313. Because the Canadian/U.S. reciprocal agreement specifies the current identification procedure, the petition was delayed until it was learned that the Canadian government "...would be relaxed about enforcement...and that the CRRL is also in favor of switching." (ARRL Letter, 03/10/87).

IT "...LOOKS LIKE VOLUNTEER EXAMINATIONS ARE COMING..." TO CANADA, SINCE THE DEPARTMENT OF COMMUNICATIONS "...HAS DISCONTINUED THEIR QUARTERLY EXAMINATIONS AND IS 'STUDYING THE CERTIFICATION OF PRIVATE EXAMINERS.'" "After June 1, examinations will be scheduled at DOC discretion as required." (W5YI Report, 04/01/87).

"MEMBERS OF THE INTERNATIONAL AMATEUR RADIO UNION HAVE BEEN ABLE TO PERSUADE DELEGATES (TO THE HIGH FREQUENCY BROADCASTING WORLD ADMINISTRATIVE RADIO CONFERENCE) THAT BROADCASTING IN THE 40 METER AMATEUR BAND IS NOT A GOOD IDEA. "There is a resolution by the conference that broadcasters are prohibited to operate between 7000 and 7100 (kHz) because it's the amateur band. "That has been adopted,"...said a member of the Dutch delegation to the international gathering. He...did not make it clear whether this was a binding or non-binding resolution on those covered by the WARC (World Administrative Conference) charter. (Westlink Report, 03/06/87).

THE NEW ENGLAND AREA FCC OFFICE HAS BEEN MOVED FROM THE "1600 CUSTOMHOUSE" BOSTON ADDRESS TO: NFPA Building, Batterymarch Park, Quincy, MA 02169. The telephone Recording number is (617) 770-3922. The Public number is (617) 770-4023. The office of the Boston Regional Director is at the same address, with a (617) 770-4325 telephone number. (ARRL Letter, 03/10/87).

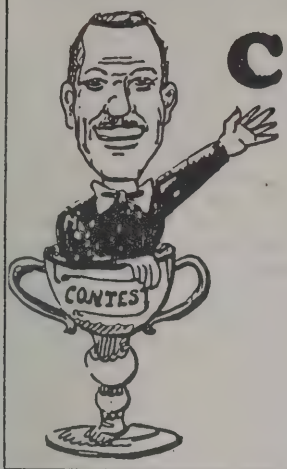
AS REPORTED LAST MONTH "...JOHN THERMES, W4MT, HAS WON HIS LONG STANDING TOWER SUIT. "The presiding Judge in the US District Court has now published the Order in the case. "It is available from the Northern Kentucky Tower Fund, PO Box 17721, Lakeside Park, KY 41017, or from ARRL HQ Regulatory Information Branch." (225 Main St., Newington, CT 06111). "Please include a SASE." (ARRL Letter, 03/10/87).

"A DETROIT AREA AMATEUR IS CLAIMING VINDICATION OF HIS NAME AND HIS PERSONAL REPUTATION AFTER HAVING THE FCC ADMIT THAT IT COULD NOT PROVE THE ALLEGATIONS OF OTHER HAMS THAT HE WAS THE CAUSE OF MALICIOUS REPEATER INTERFERENCE." A consent decree "...served to resolve all issues arising from the alleged violations...and stated that no further action would be taken against him or any of the licenses that he holds." He did agree to make a "voluntary monetary contribution of $500 in recognition of the cost of enforcement efforts to assure the efficient operation of amateur radio repeaters." Westlink Report, 03/20/87).

NOTICING A TOWN BOARD'S PROPOSAL TO ENACT A SATELLITE DISH ORDINANCE WHICH WAS SO BROAD AND VAGUE THAT IT COULD HAVE PROHIBITED ALL AMATEUR RADIO ANTENNAS AS WELL, A NEW JERSEY AMATEUR, WB2SFG, WAS ABLE TO GET ACTION DELAYED WHILE HE GOT CONCERNED INDIVIDUALS AND AMATEUR ORGANIZATIONS INVOLVED. Following discussions with the town board and the planing board, the proposed ordinance was withdrawn and the local radio amateurs were requested to work in conjunction with the planning board to draw up an acceptable substitute." It is "...always wise to keep a sharp eye on local notices, because your city or town could be next." (Westlink Report, 03/20/87).

THE FCC HAS WRITTEN GLENN BAXTER, K1MAN...SEEKING INFORMATION ABOUT A FORMAL COMPLAINT RECEIVED CHARGING THAT (HE) VIOLATED SECTION 97.110 (PROHIBITING BUSINESS COMMUNICATIONS) AND SECTION 97.113 (PROHIBITING BROADCASTING) ON THE TWENTY METER HAM BAND DURING AN EARTHQUAKE CRISIS LAST FALL IN EL SALVADOR." "An unnamed complainant provided a tape recording to FCC of an amateur radio contact between K1MAN and HC2DZ/YS1, a Salvadoran amateur station. "Glenn is charged with allowing (a US Network news man) to conduct interviews and to gather information concerning the earthquake." FCC wrote Baxter as follows: "An amateur station may not be used for any activity directly related to program production or newsgathering for broadcast purposes. "News information may be conveyed by and amateur station -only- when all of these conditions are met: (1.) the event is unforeseen; (2.) the news information is directly related to the event; (3.) the event involves the safety of human life or the immediate protection of property; and (4.) the news information cannot be transmitted by any means other than by an amateur station because of the remote location of the originating station or because normal communications have been disrupted. "If alternative communication facilities are available, an amateur station may not be used to convey the information, even if the other elements are present." Baxter said that the news network "...was continuously connected (for nine hours) via phone patch to El Salvador. "...the U.S. Embassy was completely destroyed" and there was concern for casualties - also (another correspondent for the same network) "...had not been heard from and had not communicated with the network." Baxter "...said he also responded to a request from the BBC in London who were understandably frantic about the 80 British nationals in San Salvador..." (W5YI Report, 03/15/87). (W4GF)

END-OF-MONTH LICENSE TOTALS		
JANUARY	1987	FEBRUARY
41,255	EXTRA	41 462
97,786	ADVANCED	97,727
115,616	GENERAL	115,535
85,536	TECHNICIAN	85,913
81,078	NOVICE	81,445
421,271	TOTALS	422,082



CONTEST RULES

FRANK ANZALONE, W1WY
CQ Magazine
14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	Apr.	25-26	Swiss "Helvetia" Contest
*	Apr.	25-26	North Carolina QSO Party
*	May	2-3	Utah QSO Party
*	May	2-3	County Hunters SSB
	May	2-3	Florida QSO Party
	May	9	Nevada QSO Party
	May	9-10	USSR CQ-M Contest
	May	16-17	ARI International Contest
	May	16-17	Michigan QSO Party
	May	16-17	World Telecomm. Contest
	May	16-23	Mich. Achievement Week
	May	23-24	UBA SWL CW Award
	May	30	ARCI QRP CW Sprint
	May	30-31	CQ WW WPX CW Contest
	June	6	YLRL Novice/Tech. Day
	June	6-8	PVRC On The Air Reunion
	June	13-14	S. America CW Contest
	June	13-15	ARRL VHF QSO Party
	June	20-21	SMIRK QSO Party
	June	20-21	NINE Land QSO Party
	June	27-28	ARRL Field Day
	July	1	Canada Day Contest
	July	10-11	Kansas VHF/UHF Sprint
	July	11-12	IARU World Championship
	July	18-19	CQ WW WPX VHF Contest
	Sept.	26-27	CQ WW RTTY Contest
	Oct.	10-11	Pennsylvania QSO Party

** Covered last month.*

Florida QSO Party

May 2, 1400Z–1900Z Saturday
May 3, 0001–0500 & 1500–2300 Sunday

This is the 21st annual QSO Party sponsored by *Florida Skip*. The same station may be worked on each band and on each mode. Phone and CW are separate contests and require separate logs. FL stations may work other FL stations, but for QSO points only.

Fla. stations are divided into two classes. Class A—Portables and mobiles operating outside own county using emergency power of 100 watts or less output. Class B—All other single and multi-operator stations.

Exchange: RS(T) and QTH. County for FL; state, VE province, or country for others.

Scoring: *For Florida*—One point per QSO. Multiply total by sum of states (49), VE provinces (12), and DX countries (maximum of 27) worked (maximum multiplier of 88). Class A stations multiply total score by 1.5 factor.

Out-of-state—Two points for each FL contact. Multiply total by FL counties worked (maximum of 67).

Frequencies: CW—3555, 7055, 14055, 21055, 28055. SSB—3945, 7279, 14279, 21379, 28579. (Also 160 and 2 meters.)

Awards: Certificates, both phone and CW, to the top single operator score in each state, province, and DX country, and each FL county. There are five plaques as follows: to the top single operator in FL and out-of-state, both on CW and SSB, and to the FL club with the highest aggregate score.

There is the usual disqualification clause for taking credit for excessive duplicate contacts and multipliers and other infractions.

Include a summary sheet showing the scoring and all essential information, include a dupe sheet for entries with 200 or more contacts, and the usual signed declaration.

A large SASE will get you sample log forms. Mailing deadline for all entries is June 6th to: Florida Skip Contest Committee, c/o North Florida ARA, P.O. Box 9673, Jacksonville, FL 32208.

USSR CQ-M Contest

2100Z Sat. to 2100Z Sun., May 9–10

Keep in mind that this is a world-wide-type contest, so do not limit your operation to the USSR only. Contacts may be made on CW or SSB, 3.5 through 28 MHz. The same station may be worked on each band, but not both modes for QSO and multiplier credit. Contacts via Oscar count as an extra band if made on UHF.

Classes: (A) Single operator, single band. (B) Single operator, all band. (C) Multi-operator, single transmitter, all band only. (D) SWL.

Exchange: RS(T) plus a three-figure QSO number. USSR stations add the number of their region (oblast) to their report.

Points: Contacts between stations on the same continent one point; different continents three points. Own country may be worked for multiplier credit but no QSO points.

Multiplier: Is determined by the number of countries worked on each band. The USSR "R-150-S" list is the standard, which essentially is the same as our DXCC, plus the following oblasts: 002, 013, 014, 056, 084-5-6-7-8-9, 090-1-2-3-4-5-6-7-8, 159, and UA1 Novaya Zemlya, UA9Kuril Is., UA0New Siberian Is.

Final Score: Total QSO points from all bands times the country/oblast multiplier from each band.

The SWL's get one point for reporting one station in the exchange, and three points if both stations are reported.

Awards: A large selection of trophies, medals, and badges in all classes for overseas winners. Badges to all entries contacting at least 10 USSR stations.

Contest contacts may be credited for USSR awards in lieu of QSL cards if request is made with entry (R-150-S, R-100-0, W-100-U. R-15-R. R-6-K. R-10-R).

Mailing deadline is July 1st to: Krenkel Central Radio Club, CQ-M Contest Committee, P.O. Box 88, Moscow, USSR.

Nevada QSO Party

0000Z to 2400Z Saturday, May 9

This is a new one sponsored by the Frontier ARS and should be a welcome event for WAS and County Hunters.

Modes: CW, SSB, Packet, RTTY, and SSTV.

Exchange: RS(T) and QTH. County for Nevada stations; state, VE province, or DX country for others.

Scoring: Each Nevada contact is worth 5 points per band and mode. All other QSOs 1 point per band and mode.

Multiplier: States, VE provinces, DX countries, and Nevada counties worked for Nevada stations (counted once only).

Out-of-state stations use Nevada counties for their multiplier (maximum of 17, maximum of 17 per band).

Frequencies: None indicated, but all bands 160 through 6 meters can be used. (No cross mode or repeaters.)

Awards: Certificates to the top scorers in each state, province, DX country, and the top scoring Novice and Technician in each state. The three top scorers in Nevada and the three top scoring Novices and Techs in Nevada will also receive certificates.

Mailing deadline for logs in June 5th to: Frontier ARS, Att: Bob Herrell, WB5PTO, 1813 Silver Birch Lane, Las Vegas, NV 89104.

ARI International Contest

1600Z Sat. to 1600Z Sun., May 16–17

It's the world working the Italian stations in this one, including San Marino, Vatican, and SMOM.

Classes: Single operator, CW, SSB, or transmitter both modes, and SWL.

Bands: All six bands 1.8–28 MHz, 1830–1850 kHz on 160, and 3613–3627, 3647–3667 kHz on 80 for Italian stations.

Exchange: RS(T) plus a QSO number starting with 001. Italian stations will include two letters indentifying their province.

Scoring: Europeans earn 2 points per QSO; others 4 points.

Multiplier: Each province and T7, HV, SMOM worked on each band.

Final Score: Total QSO points times the sum of the multiplier from each band. A declared score exceeding more than 5% of the actual score means disqualification.

Awards: Certificates to the top-scoring stations in each country in each class. Special awards to the five leading stations in each class.

Use a separate log sheet for each band, and a summary sheet showing the scoring from each band and other essential information. Include your name and address in block letters.

The Worked All Italian Provinces award is issued to stations working at least 60 different provinces. Application can be made by including a separate list of provinces worked during the contest with your log. QSL cards are not required. Include 10 IRCs to cover cost.

Mailing deadline is 40 days after end of contest to: Giorgio Beretta, I2VXJ, via Sciesa 24, 20135 Milano, Italy; or ARI Contest Manager, via Scarlatti 31, 20124 Milano, Italy.

Michigan QSO Party

1800Z Sat. to 0300Z Sun., May 16–17
1100Z Sun. to 0200Z Mon., May 17–18

This year's party is again being sponsored by the Oak Park ARC. The same station may be worked on each band and mode, portable/mobile in each county change. Contacts between Mich. counties are permitted for QSO and multiplier credit.

Exchange: RS(T), QSO no., and QTH. County for Mich.; state or country for all others.

Scoring: *For Mich.*—One point for phone contacts, 2 points if on CW, and 5 points if with club station W8MB.

Multiply total by (states + countries + Mich. counties) worked for final score. KH6 and KL7 count as states, VE as a country (maximum of 85).

Out-of-state—One point for each Mich. phone QSO, 2 points if on CW, and 5 points if with W8MB. Multiply total by Mich. counties worked for final score (maximum of 83).

VHF scoring same as above except multipliers from each band are added together for final multiplier. Repeater contacts are not permitted.

7035, 7125, 14035, 21035, 21125, 28035, 28125. SSB—1855, 3905, 7280, 14280, 21380, 28580. VHF—50.125, 145.025, 146.52.

Awards: Certificates to the winners in each state, country, and Mich. county (minimum of 50 QSOs). Six plaques to top Mich. winners: single operator, upper peninsula, multi-operator, VHF, mobile, and aggregate club score (minimum of 100 QSOs). And out-of-state station.

Party contacts do not count toward the Michigan Achievement Award unless one fact about Mich. is exchanged.

A summary sheet is requested with your entry showing the scoring and other pertinent information, plus a signed declaration that rules and regulations have been observed. Include a large SASE for a copy of the results.

Mailing deadline is July 1st to: Mike Shaw, K8ED, 27600 Franklin Road, Apt. 516, Southfield, MI 48034.

Michigan Achievement Week

May 16–23, 1987

All contacts with Michigan stations made during Michigan Week, May 16–23, including the QSO Party, may be used for this award if the following requirements are fulfilled.

1. Mich. stations—Submit a log with information, name and address of station worked if possible, of 15 or more QSOs with out-of-state or DX stations with information about Michigan.

2. Out-of-state stations including Canada—Submit a log with information, name and address if possible, of at least 5 Mich. stations worked who related facts about Michigan.

3. DX stations—Work at least one Mich. station, with log information, name, and address, and relate a fact about Mich. given by the station worked.

4. Only contacts made during Michigan Week, May 16–23, are valid for this award.

Applications for certificates must be postmarked no later than July 1, 1987. Mail to Governor James Blanchard, Lansing, MI 48902.

(Facts about Michigan: State Bird, Robin; Fish, Trout; Flower, Apple Blossom; Tree, White Pine; Stone, Petoskey; or any local facts.)

World Telecomm. Contest

0000Z Sat. to 2400Z Sun., May 16–17

This world-wide activity is sponsored by the LABRE in celebration of the World Telecommunication Day, May 17th.

Phone and CW are separate contests and require separate logs. Use all six bands 10–160 meters. (No WARC bands.)

Categories: Single operator, all bands. Multi-operator, single transmitter, all band. (Must remain on same band at least 10 minutes before changing to another band.)

Exchange: RS(T) plus ITU Zone. (See ITU Zone chart.)

Points: Contacts between stations on the same continent but different countries are worth 1 point on 10/15/20 meters, 2 points on 40/80/160 meters. Contacts between stations on different continents are worth 2 points on 10/15/20 meters, 4 points on 40/80/160 meters.

Contacts between stations in the same country are permitted for zone multiplier only, no QSO points.

The same station may be worked on each band for QSO and multiplier credit. The WAC and DXCC lists are the standards.

Multiplier: The 75 geographical ITU Zones worked on each band.

Final Score: Total QSO points from all bands times the sum of ITU Zones worked on each band.

Awards: Certificates to the first-place winners in each category in each country; second- and third-place awards will also be considered. A handsome plaque goes to the country with the highest aggregate score determined by the top 5 single operator scores plus the top multi-operator score of that country, both or phone and CW. The plaque remains in the possession of the national amateur radio association of that country affiliated with the IARU.

Use a separate sheet for each band and indicate the zone multiplier in a separate column only the first time it is worked. Logs must be checked for duplicate contacts, correct QSO points, and multipliers.

The usual disqualification rules are in effect—regulations in the country of operation and the contest, excessive duplicate contacts, and unsportsmanlike conduct.

Include a summary sheet showing the scoring, a signed declaration that all rules have been observed, and your name and address in block letters.

Mailing deadline is July 31st to: LABRE ITU Contest Committee, P.O. Box 07-0004, 70 000 - Brasilia - DF, Brazil.

ARCI QRP CW Sprint

0500Z to 0900Z Saturday, May 30

This is a shorty, only 4 hours, but it's going to take you another 4 hours to score your log. The ARCI really went overboard on the scoring in this one. I strongly advise you to send a large SASE to KA5NLY for a detailed copy of the rules and official forms.

Following is a basic summary of the format.

Exchange: RST and state, province, or country. ARCI members will also include their membership number. Non-members their power output.

Scoring: Contacts with members 5 points. With non-members 2 points. The same station may be worked on each band for QSO and multiplier credit.

Multiplier: States, VE provinces, and DX countries worked on each band.

Power Multiplier: 4 to 5 watts output ×2, 3 to 4 watts output ×4, 2 to 3 watts output ×6, 1 to 2 watts output ×8, less than 1 watt ×10, and over 5 watts check log only.

Bonus Multiplier: Power source natural or battery ×1.5. Antenna single element, dipole, vertical, etc., ×1.5. Double whammy—if you qualify for both do not use above, use ×2.5.

Bonus Points: Work all 10 US call districts add 200 points. Work 5 VE provinces add 200 points. Work 5 DX countries add 200 points. Homebrew transmitter add 300 points. Homebrew receiver add 500 points. Earn any three of the above and you've hit a home run, so double your bonus points. Earn all the above bonus points and you've hit a grand slam, so triple your bonus points. *(I told you it wasn't going to be easy.—ed.)*

Final Score: Total QSO points × QTH multiplier × Power multiplier × Bonus multiplier + Bonus points.

Frequencies: 1810, 3560, 7040, 14060, 21060, 28060, and 50360 kHz (no WARC bands).

Awards: Certificates to the top 5% scores in overall scores and the top scoring station in each state, province, and DX country. There will be certificates for those earning the double whammy, home run, or grand slam.

Use a separate sheet for each band and a summary sheet showing the scoring and other essential information. Include a large SASE for a copy of the results.

Mailing deadline is June 30th to: Eugene Smith, KA5NLY, Pentagon P.O. Box 46599, Washington, DC 20050-6599.

CQ WW WPX CW Contest

0000Z Sat. to 2400Z Sun., May 30–31

Just a reminder, as if you needed one, that our WW WPX CW Contest is coming up the last weekend of this month. Rules and scoring are the same as for the SSB section last March and were given in detail in the January issue and briefly reviewed in the March Calendar.

Following are a few items to keep in mind:

Par. I—Only 30 hours out of the 40-hour contest period may be used by single operator stations. Off times must be at least 60 minutes long. Multi-operator stations can use the full 48 hours.

Par. IV—Multi-operator, single transmitter. Only one transmitter and one band permitted during the same time period (defined as 10 minutes). No QSYing to another band to pick up a new multiplier.

Par. VI—QSO points on the three lower bands (7, 3.5, and 1.8 MHz) are worth double those for contacts on 28, 21, and 14 MHz. Own country may be worked for multiplier credit only (making U.S. contacts very attractive).

Par. VII—The prefix multiplier is counted once only, not once on each band. Definition of a prefix is clearly spelled out in the rules. The WPX Awards list cannot be used as a guide in the WPX Contest.

Stations operating in a call area other than that of the call sign are required to indicate the area of operation. The portable prefix is the multiplier (i.e., W8IMZ/4 counts as W4; N8BJQ/KP2 counts as KP2).

Par. IX—Eligibility for the many plaques remains at two years except for categories as indicated.

Mailing deadline is July 10th, but will be extended for rare isolated areas. Be sure to indicate CW on the envelope.

All logs go to: *CQ* Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 U.S.A. Questions pertaining to the WPX Contest can be sent to: WPX Contest Director, Steve Bolia, N8BJQ, via *CQ*.

YLRL Novice/Tech Day

1700Z to 2100Z Sat., June 6

This is a new one organized by the YLRL to promote activity for the YL Novice and Technicians. Operation will be for YL's, on CW only.

Exchange: Station worked, RST, name, QTH, and class of license.

Scoring: Three points for each YL Novice/Tech worked. Two points for YL General or Advanced class, and 1 point for YL Extra class.

The same station may be worked on each band for credit. Score each band separately. The sum of your score on each band is your final score.

Frequencies: 3730, 7130, 21130, and 28130 MHz, plus or minus 10 kHz. Maximum power of 200 watts.

Awards: YLRL postcards to the top scoring Novice/Tech and General class or higher YL.

Submit original log only, which must be signed by the station operator. Include a summary sheet showing the scoring and other essential information, including your license class and address.

All entries must be received by July 3rd and go to: Mary Lou Brown, NM7N, 504 Channel View Dr., Anacortes, WA 98221.

PVRC On The Air Reunion

1400 to 1800 UMT Sat., June 6
0000 to 0600 UMT Sun., June 7
2200 Sun. to 0200 UMT Mon., June 8

This "On The Air Reunion" is open to all past and present Potomac Valley Radio Club members. At the last count there were about 530 eligible.

Look for activity on 3547, 7047, 14047, 21047 MHz CW, and 14247 MHz SSB only.

(Carl Anderson, W3XE, who sent me the announcement, made no mention about any awards, but I wouldn't be surprised if the "top banana" received his just reward.—ed.)

Your logs go to: Walt McGugan, W3FG, 1059 Omar Dr., Crownsville, MD 21032.

We certainly did not plan the double contest dates on February 21st and 22nd, with both the ARRL CW DX and our World-Wide 160 SSB contests on the same weekends. These two major contests are traditionally held on the third and last weekends of February each year. Unfortunately, there were only three full weekends in February this year, so they both ended up on the same dates. Fortunately, this will not happen again for the 10 next years.

The anticipated confusion, however, did not materialize. No serious QRM problems between the two activities were heard or reported. The ARRL CW activity kept below 1830 kHz, and the CQ SSBers wisely operated above that frequency well up in the band. The advised use of the DX Window was not practical for SSB operation, as that spot was completely saturated with CW activity.

We probably lost quite a few of the prominant top banders who normally complete in the *CQ* 160 SSB Contest, but they chose CW for their weekend contesting. The band was sure loaded with SSB signals, however, and you can expect many new winners in this year's affair. Conditions were fairly good except for high QRN levels in some areas.

Some of the DX stations still neglect to sign their call when they have a run going and only identify after someone asks, "What is your call?" It was a pleasure to work those who used their call instead of QRZ after each completed contact.

You can expect a crowded Contest Calendar this fall. I foresee many conflicting dates in September and October, which are already full with established contests. The addition of new activities, some of which are similar in format to those already scheduled, is sure to add to the frustration. *C'est la vie*, what is to be will be.

Again, a reminder: deadline for material of events in August is May 15th, and June 15th for your September announcements. Send them to my home address, please.

73 for this time, Frank, W1WY

IRSA RADIOSPORTING
1987 WRC CONTEST
PHONE - OCT. 10
CW - OCT. 11

CAN-AM CONTEST COMMENTS:

VE3DJ/1: FB - lot's of fun in a different QTH. VE1AGZ: Great contest. The broadcast stations (on 40 m) didn't help my score, but they didn't spoil the fun either. VE3AXV: My computer had a disk I/O failure that wiped out contacts 123 to 165 or so. Had fun, see you next years! VO1QU: Started receiving QSL cards 5 days after the contest - you operate and take your chances, Hi. VE6JO: One OM called me and asked why I am in the contest, if in his Callbook I am listed as "Silent Key"...? VE7QO: Phone conditions were good - lots of Ws, CW very poor. VE7KGW: First time, first rate! VE3KK: A most enjoyable contest where I met several old friends including W1BFT that I last had a QSO with when I was CT2AA in 1929.

KI3V/7: Ihad an excellent time in this year's CAN-AM from my new QTH. My first stateside contest from new QTH - what a difference! I hope that conditions are better next year for 10 and 15 meters, keep up good work! N3EYD: The contest was great I really enjoyed it. My age is 16 and tis is only the second contest I have been in. W5NR: Participation seems to be increasing and hope next year is helped also by the susnpot cycle. NØFMR: I stayed on 40 meters this year to avoid the crowds, Hi. W5ASP: Having phone and CW on same weekend is not a good idea. Go back to old format and start sat 1500 UTC. CW turnout down. N6OP: More activity this year! K5NW: This is a great contest, don't know why more people don't enter it. Absolutely no 15 meters this year really hurt scores. Maybe next year. KC7V: Where was everybody hiding on 75 m? Very little activity compared to CW. Noise levels were very bad here. 40 and 20 meters provided the bulk of the contacts. N5IJI: This was my first contest and I enjoyed it. At the age of 10, I think this gave me valuable experience. WN3VAW: Biggest thrill of the contest: working my first Yukon Territory (VY1CW) in 15 years, I hope he QSLs. W8YGR: (ex 3JL, C3GJ) I was personal friend of Jimmy Cotter, VE3JW when he was C3EN in my home town of Ottawa. KN1H: Sorry I didn't have more time for the contest, it's definitely one of my favorites - hopefully next year. KH6CP/1: Somehow I don't think a dipole at 30 feet is adequate for contesting. W7KZK: No signals on 10 and 15 See you next year. WDØGVY: Best CAN-AM yet, these bands are not dead!

8703

KH6BZF PROPAGATION REPORT

Lee Wical, 45-601 Luluku Rd; CRT #44-25, Kane'Ohe, HI 96744

The first diagram shows the value of solar flux (top curve) and SSN - sunspot number (bottom curve). The Y axis and scale is the same for both. The X axis is calibrated in days of the month.

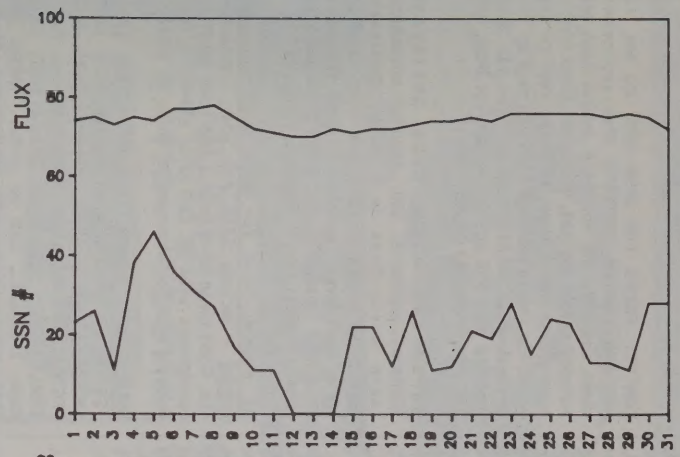
The second diagram shows variation of the Alpha Index for each day - an area limited by two curves. [I.e. A, and A planetary (world value)]

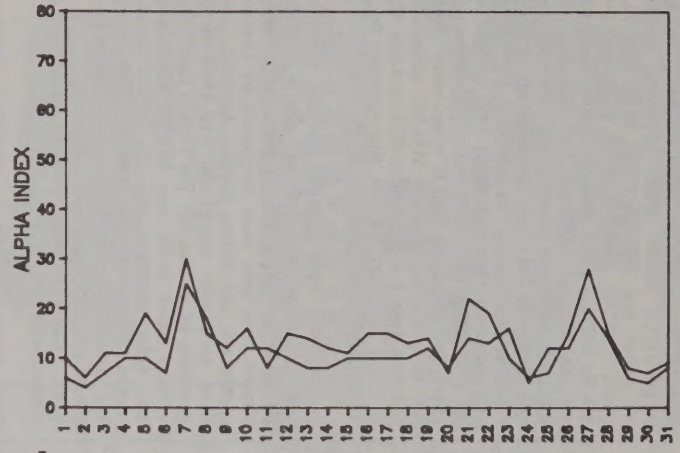
The third diagram shows the propagation quality (CONDX), where the scale is: 5 = Above Normal, 4 = High Normal, 3 = Low Normal, 2 = Below Normal, 1 = Disturbed.

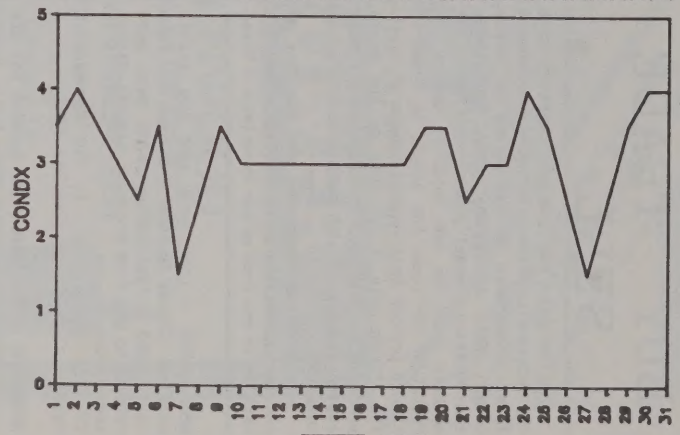
The Geomagnetic Field Level scale reads as follows: 0 = Very Quiet, 1 = Quiet, 2 = Unsettled, 3 = Active, 4 = Minor Storm, 5 = Major Storm.

To make your own forecast look at the diagrams and tables for values 27.5 and 55 days ago, also check the WWV transmissions (18 minutes after the hour) for daily values and make your own accurate predictions.

Statistical information is compiled by KH6BZF and processed on a computer by VE3BMV/W2.







MARCH 1987

THOUGHTS FROM THE RAINBOW BAY: Remember: THE OLDER WE GET... THE BETTER WE CONTEST!!! YOU CAN BE POOR AND HAPPY.... JUST NOT AT THE SAME TIME!!! WHEN THINGS START COMING YOUR WAY... MAKE SURE IT IS NOT BECAUSE YOU ARE DRIVING ON THE WRONG SIDE OF LIFE'S ROAD!!! THERE IS INTELLIGENT LIFE ON EARTH... BUT I'M JUST VISITING!!! REMEMBER: ONLY THOSE WHO ATTEMPT THE ABSURD... CAN ACHIEVE THE IMPOSSIBLE!!! WATCH THE REGION 4786, IT MAY BE A HARBINGER OF CYCLE 22!!! SEE YOU IN DAYTON, GD DX!

1987 MAR	CNDX	SOLAR FLUX	SOLAR LEVEL	SSN#	GEOM.L FM	GEOM.L TO	ALPHA FROM	ALPHA TO	K	NOTES
1	3.5	74	VY LOW	23	2	2	6	10	2	RGN 4773(1) 4775(2)
2	4.0	75	|	26	1	1	4	6	2	RGN 4773(3) 4775(3)
3	3.5	73	|	11	1	2	7	11	2	RGN 4773(1)
4	3.0	75	V	38	2	2	10	11	2	RGN 4773(3) 4777(3) 4778(2)
5	2.5	74		46	1	3	10	19	3	RGN 4773(2) 4777(3) 4778(11)
6	3.5	77		36	2	3	7	13	2	RGN 4773(1) 4778(15)
7	1.5	77		31	3	4	25	30	2	RGN 4778(21)
8	2.5	78		27	1	3	18	15	3	RGN 4778(17)
9	3.5	75		17	2	1	8	12	2	RGN 4778(7)
10	3.0	72		11	1	3	12	16	4	RGN 4778(1)
11	3.0	71		11	1	2	12	8	3	4787(1)
12	3.0	70		0	2	3	10	15	2	NO SUNSPOTS
13	3.0	70		0	2	2	8	14	2	NO SUNSPOTS
14	3.0	72		0	2	2	8	12	1	NO SUNSPOTS
15	3.0	71		22	2	2	10	11	2	RGN 4779(1) 4780(1)
16	3.0	72		22	2	2	10	15	2	RGN 4779(1) 4780(2)
17	3.0	72		12	2	2	10	15	2	RGN 4780(2)
18	3.0	73		26	1	2	10	13	3	RGN 4779(1) 4780(5)
19	3.5	74		11	3	1	12	14	2	RGN 4779(1)
20	3.5	74		12	1	2	8	7	3	RGN 4781(2)
21	2.5	75		21	3	1	14	22	5	RGN 4781(11)
22	3.0	74		19	3	4	13	19	2	RGN 4781(9)
23	3.0	76		28	2	1	16	10	2	RGN 4781(7) 4782(1)
24	4.0	76		15	2	3	5	6	1	RGN 4781(5)
25	3.5	76		24	1	2	12	7	3	RGN 4781(3) 4783(1)
26	2.5	76		23	2	2	12	15	3	RGN 4781(2) 4783(1)
27	1.5	76		13	3	4	20	28	3	RGN 4783(3)
28	2.5	75		13	4	1	14	15	2	RGN 4783(3)RGN 4783(3)
29	3.5	76		11	1	2	6	8	2	RGN 4783(1)
30	4.0	75		28	1	1	5	7	2	RGN 4783(5) 4784(5)
31	4.0	72		28	1	2	8	9	2	RGN 4783(6) 4785(2)

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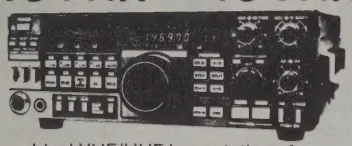

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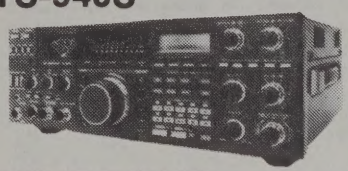

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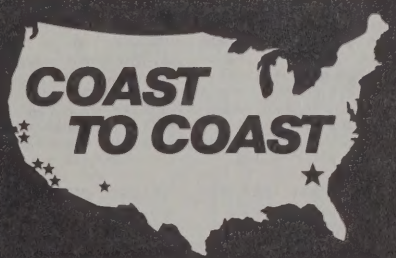

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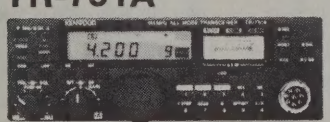

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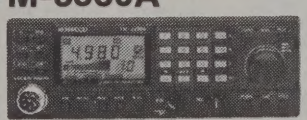

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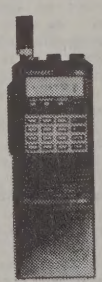

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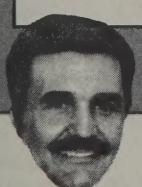

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We welcome articles and contributions from our readers. It is your publication. Material can be submitted on diskettes, via MODEM or on paper.

DXCA

DX CENTURION AWARD

GENERAL RULES

The DXCA program is sponsored by the International Radiosport Association and RADIOSPORTING magazine for all licensed radio amateurs and short wave listeners all over the world.

All contacts must be made from the same country. Maritime, aeronautical and land mobile stations may operate from anywhere in the world.

Only contacts made after January 1, 1986 are valid for the basic award.

Awards for club stations will be issued to the club and not to an individual operator.

All amateur bands for which an applicant holds a valid license may be used, including new WARC bands.

QSL cards for the awards must be in the possession of the applicant. The application for the award must be certified by two licensed amateurs with a statement that the list of contacts and QSL cards agree. Any altering or forging will result in disqualification. The IRSA Awards Committee has the right to request the QSL cards for verification.

The ARRL DXCC countries list criteria will be used in determining what constitutes a "country." A particular operation or DXpedition does not have to be recognized by the ARRL in order to count for DXCA (i.e. Burma). As long as there is a reasonable proof that the operation took place as claimed, it will be recognized. If it is found in the future that certain operations were not legitimate, the credit for that operation will be removed from all applications claiming the operation in question.

All officially allowed modes of communication may be used: CW, SSB, AM, FM, RTTY, Packet, SSTV and Mixed mode. Also separate categories will be recognized for satellite contacts, QRP, QRPP and Mobile stations. All contacts must be two way, using the same mode, except for the mixed mode. A valid contact must consist of a call sign and signal report exchange.

All claimed contacts must be made by the operators themselves, without the help of a third party, i.e. list or net operation. Non interference with commercial services on shared bands, fair play and good sportsmanship are required of all DXCA holders and applicants. In the event of specific objections relative to continued poor operating ethics, an individual may be disqualified from the DXCA by action of the DXCA Awards Committee.

The application must contain a station's callsign, name and address, type of award applied for and list of contacts. The list of contacts and any QSL cards in possession must include: callsign, signal report received, band, date, time GMT and two way mode.

Callsigns of all certificate holders will be published in RADIOSPORTING magazine and a DXCA Honor Roll will be published twice a year.

The first twenty winners of monoband and multi band awards will receive a free one year subscription to RADIOSPORTING Magazine.

The decisions of the IRSA Awards Committee are final.

SINGLE BAND DXCA

Single band DX Century Award is issued for working or hearing a minimum of 100 countries on one band. Endorsement stickers are issued in increments of 20 countries up to 240, increments of 10 up to 300 and increments of 5 above 300 countries.

Contacts made on all amateur bands (1.8, 3.5, 7, 10, 14, 18, 21, 24, 28 MHz and all VHF/UHF bands), as permitted by the license in the country of the applicant, are eligible for award. All contacts must be made on one band. No crossband contacts are allowed.

The basic award will be issued for a minimum of 100 countries confirmed on one band. A numbered endorsement stickers will be issued for each mode (CW, SSB, AM, FM, RTTY, Packet, SSTV and Mixed) and category (satellite contacts, QRP, QRPP and Mobile stations).

The holders of Single Band DXCA are allowed to use the abbreviation signifying the type of award and country total on their QSL cards.

Example: "1.8 DXCA" or "1.8CW DXCA 124/265" which means: Monoband 1.8 MHz, all CW mode, DXCA, 124 countries confirmed since Jan. 1, 1986/ number of countries worked.

MULTI BAND DXCA

6B DXCA, 7B DXCA, etc. awards will be issued for confirmations from a minimum of 100 countries on each of at least 6 bands. A separate awards will be issued for working 100 countries on 7, 8, or more bands.

Also a cumulative total will be kept for an overall countries count similar to the monoband awards. i.e. 7B DXCA (856/1265), which signifies that station has confirmed a minimum of 100 countries on each of 7 bands and the total count is 856 countries since Jan. 1, 1986 and 1265 countries on 7 bands worked. A numbered stickers will be issued for each mode and category.

Stations having monoband DXCA need not submit the list of contacts already credited for monoband awards. It is sufficient to mention the certificate type and number, and only an additional list of contacts has to be submitted.

Stickers for increments of 100 countries will be issued from 600 to 2000, increments of 50, from 2000 and up.

The Honor Roll - listing of top contenders and latest changes in standings will be published in RADIOSPORTING magazine twice a year.

The fee for each award is US $5 or 10 IRCs, and each endorsement sticker is $2 or 4 IRCs. Engraved Honor Roll plaques will cost $25.

A set of application forms and countries list for DXCA awards are available from IRSA for SAE and 3 IRCs.

All applications to be sent to IRSA - DXCA, Box 282, Pine Brook, NJ, 07058, USA

INTERNATIONAL MONTHLY MAGAZINE BY AND FOR ACTIVE RADIOAMATEURS

Radiosporting

Editor/Publisher Yuri Blanarovich, VE3BMV/W2

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WRC Contest	Walt McGugan, W3FG
6 meters	Harry Schools, KA3B
10 meters	Dr. Harry Arsenault , K1PLR
80 meter DXing	John Devoldere, ON4UN
160 meters	Dennis Peterson, N7CKD
	Dr. Wally Stefanoff, LZ2CJ
Europe	Erik Sjolund, SMØAGD
	Franz Langner, DJ9ZB
Asia	Tack Kumagai, JE1CKA
Africa	Sam Ford, ZS6BRZ
Awards	Gary Hammond, VE3XN
Radio Funnies	Mike Crabtree, ABØX
Direction Finding	Mike Petkoff, LZ2DF
Advertising, producttn.	Sonya Blanarovich
Keyboarding	Adrian & Orest Blanarovich
Cartoonist	Eugene Radewych
	Dave Heil, K8MN/OH2

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